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Acute Hazardous Events Data Base

Industrial Economics, Inc., Cambridge, MA

Prepared for

Environmental Protection Agency, Washington, DC

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ACUTE HAZARDOUS EVENTS

DATA BASE

Prepared for

The Office of Toxic Substances
Economics and Technology Division
U.S. Environmental Protection Agency
under
EPA Contract No. 68-02-4055

Prepared by

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This document, developed by the U.S. Environmental Protection Agency (USEPA) is part of the USEPA National Air Toxics Strategy. The study was undertaken in support of EPA's Chemical Emergency Preparedness Program (CEPP) which deals with accidental releases of acutely toxic chemicals.

The Acute Hazardous Events Data Base (AHE) document contains summaries of records of 3,121 accidental releases of hazardous substances. Because of sampling, these records represent a larger population of 6,928 events. The data base was assembled from two federal reporting systems, from reports maintained by four states, from news media, and from a published historical summary. the sources cover different portions of the 1980 to 1985 time period. Priority was given to events associated with deaths or injuries, with releases to the air, and with the release of toxic chemicals. One section describes the background and methodology. Another discusses the 468 events associated with the reported 4,717 injuries and 138 deaths. Other sections summarize the events as a whole, with attention to end effects, causes and quantities. A section considers large-scale atmospheric releases, assessing similarities to the Bhopol accident. Appendices contain the data coding procedures; summary data base profiles; a list of —>

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chemicals reportedly released; summary statistics for events with reported deaths of injuries and for events with spills or vapor releases, but not fires or explosions; and a brief listing of all events with reported deaths or injuries.

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FORWARD

EPA published criteria for selecting substances on a listing of acutely hazardous substances, as well as a list resulting from the application of those criteria, in December 1985. Guidance documents for making use of the criteria and list were made available at the same time. Those materials were published as interim final documents, with opportunity for public review and comment.

The data base that is the subject of this report was developed as a part of the process of establishing the list-making criteria, and information from the data base was used in drafting the published criteria. EPA plans to add other records to the historical profile presented in this interim final report, in order to aid in the validation of the list-making criteria. Current plans are to supplement the current 3,121 records with records from two additional years of data from the National Response Center and from one or more State sources.

Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

ACUTE HAZARDOUS EVENTS DATABASE

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This study was conducted under EPA Contract Number 68-02-4055 by Industrial Economics, Inc.; Management Technology and Data Systems, Inc.; and PEI Associates, Inc. The principal members of the project team were: Dr. James Cummings-Saxton, Ms. Laura Lechner, and Ms. Anne E. Crook (Industrial Economics, Inc.); Dr. Samuel J. Ratick, Mr. Patrick Buckley, and Mr. Stephen Wu (Management Technology and Data Systems, Inc.); and Mr. Thomas K. Corwin, Mr. Edwin A. Pfetzing, Mr. E. Radha Krishnan, and Ms. Barbara A. Bruce (PEI Associates, Inc.).

The project team received valuable and generous assistance from individuals in several organizations in acquiring and making use of the data that went into the study. Among these are the EPA Office of Solid Waste and Emergency Response and the Transportation Systems Center of the U.S. Department of Transportation for access to the National Response Center data; EPA's Region 7, for making available its computerized data base; the California Highway Patrol and Office of Emergency Services; the New Jersey Department of Environmental Quality; the Ohio Environmental Protection Agency; and the Texas Air Control Board.

Several EPA employees had active roles in the project. Mr. Frederick W. Talcott was responsible for assembling and coding records from the news media; he was assisted by staff members of the EPA Headquarters Library and the Office of Standards and Regulations. Both Mr. Talcott and Ms. Karen East conducted analytic studies using the data base that have substantially contributed to this report. Mr. James Cottrell of the EPA Office of Toxic Substances, Information Management Division, provided valuable assistance in assigning CAS codes to several hundred listed substances.

We would like to thank the EPA project officers, Mr. Frederick W. Talcott and Mr. Neil Patel, for their active guidance and participation. Overall design and direction was provided by the Analysis Subgroup, led by Mr. Talcott, and including Ms. East, Mr. Patel, and Mr. David Wagner. These individuals and other members of the Acute Hazards List Workgroup provided reviews, comments, and other valuable assistance throughout the study effort.

Copies of this Executive Summary and of the full report, Acute Hazardous Events Data Base (report number EPA 560-5-85-029) are available to the public from the National Technical Information Service, Springfield, Virginia 22161

EXECUTIVE SUMMARY

The Acute Hazardous Events Data Base was assembled as part of EPA's review of the dangers posed to the U.S. public and industrial workers by sudden, accidental releases of toxic chemicals. Concern regarding such releases was heightened by the tragic incident that occurred on December 3, 1984 in Bhopal, India. EPA formed an Acute Hazards List Workgroup to investigate the safety-related characteristics of U.S. industry with regard to accidental chemical releases that could pose exceptional risks to human health, and to identify those chemicals that appear to represent unusually high risks. In late May, the decision was made to assemble an Acute Hazardous Events Data Base as part of the Acute Hazards Analysis review process.

PURPOSE AND APPROACH

The main purpose of the AHE Data Base is to characterize the kinds of events releasing acutely toxic substances in the U.S., the substances involved, and the causative factors leading to their release. The AHE Data Base provides a historical perspective for those in the Acute Hazards List Workgroup who are assessing selection criteria for a priority list of acutely hazardous substances. The AHE Data Base was not constructed to serve as a basis for nation-wide estimates of frequencies of events, quantities released, or their consequences. Emphasis was placed on acquiring a measure of the scope of events rather than on estimating quantities precisely or frequencies of releases.

An important factor in the AHE Data Base development was the need for it to be assembled quickly in order to support other aspects of the analysis process. Because of the rigorous time constraints, several criteria were employed to screen data for inclusion in the AHE Data Base. Emphasis was placed on incidents that had acute hazard potential. Incidents that involved death or injury were given highest priority. EPA further directed that priority be given to incidents involving chemicals released into air. Chemical releases were given priority over petroleum-related and other types of releases. Releases involving large quantities of material were given priority, and quantities involving less than one pound were not coded. Incidents involving evacuations also were given priority.

Through these data collection criteria, the AHE data base has been purposely biased toward events considered to have the greatest potential for sudden, large-scale harm to the populace. Thus, the summary statistics obtained from the data base are not reflective of the totality of potentially hazardous domestic materials released.

DATA SOURCES

The data base contains 3,121 records which, through sampling, represent 6,928 separate events. One nation-wide government source, the National Response Center, contributed 1,225 records. A multi-state regional source, EPA's Region 7, provided 513 records. Five offices within four state governments were the source of 1,029 records. Four daily newspapers and one wire service contributed 290 records. Finally, 64 records were obtained from a summary prepared by an engineering consulting firm specializing in industrial accidents.

EVENTS WITH INJURIES OR DEATHS

Human casualties occurred in fewer than seven percent of the recorded events. These events -- a total of 468 -- led to 138 deaths and 4,717 injuries, ranging in severity from temporary respiratory problems treated on-site to critical injuries and extended hospitalizations. Information on causation was scanty in many records.

Four high-volume industrial inorganic chemicals (chlorine, ammonia, hydrochloric acid and sulfuric acid) together were reported to have been released in over 25 percent of the events recording human casualties. Over 200 additional identifiable substances were recorded as released during events associated with deaths or injuries.

Neither great quantity nor high inherent toxicity alone produce the conditions for human casualties. When the characteristics of the released substances are examined, toxicity appears to be the cause of most of the injuries recorded, while flammability and explosivity are the mechanisms associated with most of the fatalities in the data base.

Transportation releases account for 25 percent of all events in the data base, and a somewhat higher percent of death or injury events (33 percent). Trucks are the predominant mode of transport in the death and injury events. Among events with human casualties at fixed facilities, storage vessels play a much larger role as release points than they do among events not leading to deaths or injuries.

When viewed from an industry perspective, the Chemicals and Allied Products and the Petroleum Refining industries together account for 34 percent of the reported injuries, and more than half of the reported deaths. The transportation industries account for 36 percent of reported injuries and about one-fourth of the reported deaths. Industries that use chemical or fuel products account for about 25 percent of the deaths and injuries.

OTHER EFFECTS

Information on evacuations, property damage and environmental damage was seldom provided in the records examined. In records furnishing such information, evacuations totalled more than 200,000 individuals, with one event accounting for 20,000 people. Information on environmental and property damage was usually expressed in vague terms. One source reported over 60 large-scale industrial accidents having an average estimated economic cost of $30 million, with one event incurring more than $100 million in estimated damages.

SUBSTANCES AND QUANTITIES RELEASED

For events reporting quantity released, the quantities approximate a log normal distribution. Amount released exceeds 1,000 pounds for over 38 percent of the recorded events. Releases over 100,000 pounds occur in less than three percent of the events, but these events account for 93 percent of the total quantity of materials released. Over 80 percent of the events in the data base reported that at least one of the substances released was a liquid; 16 percent of the events involved the release of a gas.

CAUSATIVE FACTORS

Among events occurring at fixed facilities, spills are the predominant end effect, followed by vapor releases, fires, and explosions. Storage vessels, process vessels, and valves or piping are responsible for nearly equal shares of in-plant events, but storage vessels typically release much larger quantities. Equipment failure is the cause most frequently reported for in-plant events, followed by operator error. Causation is difficult to assess for many of the events in the data base, however.

Over half of the in-transit events involve trucks, another 36 percent involve rail cars. Over 38 percent of the in-transit releases stem from a leak, and another 20 percent from collisions. Although few events were reported for pipelines, those spills dwarf other in-transit releases in terms of total quantity released.

PROJECT BACKGROUND AND DATA BASE CHARACTERISTICS

PROJECT BACKGROUND

The Acute Hazardous Events (AHE) Data Base was assembled as part of EPA's review of the dangers posed to the U.S. public and industrial workers by sudden, accidental releases of toxic chemicals. Concern regarding such releases was heightened by the tragic incident that occurred on December 3, 1984 in Bhopal, India. EPA formed an Acute Hazards List Workgroup to investigate the safety-related characteristics of the U.S. industry with regard to accidental chemical releases that could pose exceptional risks to human health, and to identify those chemicals that appear to represent unusually high risks. In late May, the decision was made to assemble an Acute Hazardous Events Data Base as part of the Acute Hazards Analysis review process.

An important factor in AHE Data Base development was the need for it to be quickly assembled in order to support other aspects of the analysis process. A team of three contractors was assembled, with Industrial Economics, Inc. responsible for overall direction. Other contractors included: Management Technology and Data Systems, Inc. (MTDS) and PEI Associates, Inc. The project was initiated in late May, 1985. An initial AHE Data Base containing 900 records was delivered to EPA at the end of seven weeks. The AHE Data Base was expanded to 2,100 records at the end of nine weeks, and reached its present 3,121 record size in mid-August. Through data sampling, the records in the AHE Data Base represent 6,928 actual incidents.

Because of the rigorous time constraints, several criteria were employed to screen data for inclusion in the AHE Data Base. Emphasis was placed on incidents that had acute hazard potential. Incidents that involved death or injury were given highest priority. EPA further directed that priority be given to incidents involving chemicals released into air. Chemical releases were given priority over petroleum-related and other types of releases. Releases involving large quantities of material were given priority, and quantities involving less than one pound were not coded. Incidents involving evacuations were also given priority.

Through these data collection criteria, the AHE Data Base has been purposely biased toward events considered to have the greatest potential for sudden, large-scale harm to the populace. Thus, the summary statistics obtained from the data base are not reflective of the totality of potentially hazardous domestic materials released.

METHODOLOGY

The main purpose of the AHE data base is to characterize the kinds of events releasing acutely toxic substances in the U.S., the substances involved, and the causative factors leading to their release. The AHE data base provides a historical perspective for those in the Acute Hazards List Workgroup who are assessing selection criteria for a priority list of acutely hazardous substances. The AHE data base was not constructed to serve as a basis for nation-wide estimates of frequencies of events, quantities released or their consequences. Emphasis was placed on acquiring a measure of the scope of events rather than on estimating quantities precisely or frequencies of releases.

Data sources were selected that yielded a large number of usable records portraying a variety of release circumstances and outcomes. The sources differed in the extent and quality of various information types. For instance, some of the state sources indicated in-plant location and attributed cause more fully than other data sources, while the news media sources more frequently provided information on the human consequences of an event. Geographical distribution was sought, with emphasis given to regions having greater petrochemical production activity. Four state data sources and four daily newspapers were accessed to provide more detailed information in those regions than the information found in the nation-wide sources.

Records were sought for the five-year period from 1980 to early 1985. Most sources were available for only a portion of that period. Time and resource constraints limited the coding of records to about three years per source, with most of the records coming from 1983 and 1984.

The National Response Center (NRC) had the most readily available records. All NRC records involving air releases or deaths or injuries were coded, and a one-tenth sample was obtained from the remaining records. For other contributing sources, records were selected using the screening criteria described above. Project emphases and priorities previously discussed influenced the amount of time and attention the coders gave to individual records.

A two-page data collection form (Appendix A) and instructions for data coders were developed and pre-tested. Coders were junior level to senior level professionals with background training or experience in engineering, chemistry, risk assessment and other disciplines. For each contributing source, the time period and other constraints on the records of interest were specified and copies of the records were acquired, usually in hard-copy form. NRC data processing entailed the most systematic effort. The DOT Transportation Systems Center provided a specially prepared computer tape from which sample records were obtained and arranged for semi-automated coding. Other sources involved computer print-outs, and some were accessed as written records. United Press International was searched on-line through a commercial time-sharing service. The other news media were searched via printed annual indexes and back issues on microfilm.

A data record structure was developed for the coded records. The EPA project officers specified that the data base be accessible using commercially available personal computer (PC) software; dBase III was selected for compatibility with most of EPA's installed PC capability. A set of standardized programs were developed to provide summaries and tabulations on the whole of the data or selected portions. Those programs produced the information presented in this report.

Error checking took place both when records were entered and after assembly into an integrated data base. Neither the study team nor EPA has made an independent verification of the information within any of the records. Error checking and editing was limited to seeing that the coded records accurately reflected the reports as received. Thus, the study team did not discover events not previously recorded elsewhere nor did they exercise quality control by second-guessing the records' details.

When one-quarter of the eventual 3,121 records had been coded and entered, preliminary results were presented for review by EPA project officers and the larger Workgroup. This process was repeated when about two-thirds of the records had been coded, and the form of most of the displays presented in this report was established at that time. Several displays (and their accompanying text) were added as drafts were circulated for comment, including some prepared by the EPA members of the study team.

AHE DATA BASE CHARACTERISTICS

- The AHE Data Base currently includes 3,121 records that represent 6,928 events.
- The data base contains information on substances and quantities released, event location, description of causative factors, and description of end effects. The latter include: deaths, injuries, and property and environmental damage. The data base also contains company names, date of event, and city and state in which the event occurred.
- The types of accidents not contained in the AHE Data Base include: citizen complaints of oily substances, foul odors, and the like; incidents that are not chemicals industry related; and incidents in which only non-hazardous materials are involved.
- Records included in the Data Base were gathered from 13 sources -- four national, four regional, and five state -- as shown in Exhibit 1 and summarized below.

  - National Response Center: Hazardous substances released nationally to air, water, and land. Includes in-plant and transport releases. PCBs and four other chemicals account for 60 percent of the records. Through a stratified random sampling scheme applied to the NRC data, the 1,225 records represent a total of 5,032 NRC-recorded events.

  - News Wire Service (UPI): Nationwide coverage of large events. Evacuations, injuries, and deaths commonly reported.

  - Marsh and McLennan: U.S. incidents included among the 100 worst industrial accidents (rated by property damage). One-tenth transportation related; the remainder split evenly between chemicals processing and petroleum refining.

  - EPA Region 7: Incidents affecting all media in Iowa, Kansas, Missouri and Nebraska.

  - Newspapers: News reports, mainly of large events. Regional coverage with emphasis on state events.

  - State Reporting Systems: Texas data cover air releases from manufacturing facilities. Ohio data include manufacturing and transportation releases. California data emphasize transportation and releases to land. New Jersey data focus on large releases and events with significant effects.

- o Exhibits 2 and 3 show the sources of Data Base events by year.

  - Marsh and McLennan (M&M): Listing of the 100 largest worldwide petrochemical accidents contributed about 50 U.S. events before 1980 and 3 or 4 per year thereafter.

- Four states (California, Texas, Ohio, and New Jersey) yielded fewer than 100 events in 1980 and 1981, then increased to 400 events in 1984.
- EPA's Region 7 contributed over 100 events for each of the years 1981 through 1984.
- The National Response Center (NRC) yielded over 500 events in 1983 and just under 700 in 1984.
- Various news media (four papers and one wire service) contributed about 50 events per year from 1980 through 1984.

- Exhibit 4 expands on the news media sources.
    - Approximately 60 newsworthy events were obtained from printed annual indexes for the LA Times (LAT), New Orleans Times-Picayunne (NTP), Chicago Tribune (CHT), and New York Times (NYT) in 1980 and 1981.
    - Full text of United Press International (UPI) stories were obtained from computer listings from April 1983 on. This source yielded about 50 events in 1983 and 1984 and 34 through early July 1985.
    - A gap in coverage occurs for the 15 months from January 1982 through March 1983. This gap is due to the time constraints imposed on the data collection process, and the extensive time required to review records of the individual newspapers.

REPORT ORGANIZATION

The remainder of this report is divided into four major sections and a set of appendices. The major sections are:

- Death or Injury Events,
- Nature of All Events,
- Circumstances of Release, and
- Large Scale Atmospheric Releases of Acutely Toxic Chemicals.

The section on death and injury events discusses average numbers of deaths or injuries, chemicals frequently involved, quantities released, mechanisms leading to deaths, circumstances of releases (such as location, cause, process state, transit mode, etc.), and industries involved.

The section on all events provides an overview of information included in the AHE Data Base. Frequently reported chemicals, quantities released, media affected, environmental and property damage, and evacuations are discussed.

The section on the circumstances of release discusses end effects, event location, cause, production configuration, contributory effects of high temperature and pressure, in-transit mode, and relationships between these factors and quantity released for all events.

The final section considers large-scale atmospheric releases of acutely toxic materials. These events are examined from the perspective of their similarity to the situation that occurred in Bhopal.

Eight appendices provide detailed background material regarding the information contained in the AHE Data Base. The Data Coding and Format Sheets (Appendix A) identify the information included in a complete record, although few records include all of this data. Data Base Profiles (Appendix B) identify the principal characteristics of the source data files providing the information assembled with the AHE Data Base. Appendix C provides a list of all chemicals included in the data base, including their common name; 4-digit SIC code of the producing sector; their Chemical Abstracts Service (CAS) identification number; and the number of incidents, injuries, and fatalities with which they are associated. Appendices D and E provide summary outputs of AHE Data Base information for all events and for death or injury events. Appendix F provides a similar summary for those events reporting a spill or vapor release as the worst end-effect. Appendices G and H provide a full list of all events in which an injury or death occurred.

DEATH OR INJURY EVENTS

Each of the original records coded into the data base was examined for indications of human casualties. In most cases, the record appeared unambiguously to indicate the presence or absence of deaths or injuries. However, about 12 percent of the records indicated injuries as unknown, and eight percent of the records listed deaths as unknown. (Exhibits 5 and 6.) Although some records in the data base may represent events that involved injuries or deaths, it was not possible to estimate the degree of under-reporting without follow-up on those events.

Some other cautions are necessary in interpreting the reported casualty data:

- Reported Deaths or Injuries: None of the events have been independently verified in this study to date, either by EPA or the team of contractors. Thus, one should view these data as "deaths or injuries reported to one or more of the contributing sources."

- Causation: Direct evidence of causation rarely exists in the contributing sources of these records. Some of the deaths or injuries reported to have occurred in association with a particular event may not, in fact, have been caused by the event. Another aspect is that some casualties may well have been caused by a triggering accident that released a substance into the environment (e.g., a truck driver whose injuries were caused by a collision, and not the succeeding exposure to released materials.) Whenever possible, deaths explicitly resulting from a collision were removed from the data base. However, it is not possible to identify how many of the deaths and injuries remaining in the data base fall into this type of situation.

- Range of Severity: Although some records indicate in some detail the type and severity of the reported injuries, most records do not. To break out the severity of injuries for these records requires an investment in detailed follow-up that was not possible during this study. Thus, an individual "injury" could range from temporary respiratory or eye irritation treated on-site to critical injury leading to prolonged hospital treatment.

- Numbers: Some of the source records provide counts of injuries that suggested precision, whereas others (explicitly or implicitly) were approximate counts. If the source provided a number, it was recorded; but sometimes it was necessary to translate phrases such as "a few" or "about 50" etc. into specific numbers. Thus, the precision of the individual records composing the data base is highly variable.

Although there is understandable interest in making nationwide estimates of deaths and injuries, the study was not designed with that purpose in mind. Rather, the objective was to better understand the kinds and causes of accidental releases. Before drawing conclusions regarding five-year national totals, the reader should carefully assess the cautionary notes above and consider the following factors:

- The five media sources (four daily papers and one wire-service) contributed nine percent of the total number of records, but those records accounted for 33 percent of the total injuries and almost 70 percent of the deaths. Although these sources together cover the period 1980 to 1985, no one source was completely searched for the entire period, and most were searched for three years or less. (Exhibit 4 and Appendix E)

- Although each of the four daily papers had a separate regional focus, they each also reported moderate to severe accidents from other parts of the country. Some events appeared in two or three of these sources, as well as occasional other sources. Thus, it is believed that most of the major events that received national media attention during the period have been included in the data base.

- On the other hand, some events involving human casualties showed up in only one of the sources searched. This suggests that one would find other events of similar magnitude both by searching additional years for the sources used in this study, and by examining other media sources with different regional specializations.

- Some types of events may not be reported to one of the contribuing sources due to the circumstances under which the events occurred, such as an event involving casualties that are limited to the work-place. The federal OSHA and state occupational safety and health records have not been examined to determine the extent of over-lap between those records and the ones in the data base. Thus, it is not possible at this point to estimate how many additional records might be identified by accessing those sources.

EXTENT OF DAMAGE

- Four hundred sixty-eight events (6.8 percent of all events) involve death or injury. Total deaths reported is 138 and total injuries 4,717.

- When injuries occur, the average number of injuries per incident is 10. Number of injuries per event ranges from 1 to 355. (Appendix E)

- When deaths occur, the average number of deaths per incident is 2. Number of deaths per event ranges from 1 to 11. (Appendix E)

- Injuries are reported for 98.1 percent of the events resulting in deaths or injuries. Deaths are reported for 13.7 percent of the events resulting in deaths or injuries. (Exhibit 5 and 6)

- Evacuations are reported almost seven times more frequently among incidents resulting in deaths or injuries. (Exhibit 7)

- For those events involving death or injury, property damage was reported in over 35 percent and environmental damage in approximately 10 percent of the events.

CHEMICALS PARTICIPATION

- The twenty most frequently reported substances account for 44 percent of the events resulting in deaths or injuries. (See Exhibit 8 for list of substances.)

  - Chlorine is involved in 9.6 percent of the events resulting in deaths or injuries. (Exhibit 9)

  - Anhydrous Ammonia, Hydrochloric Acid, and Sulfuric Acid are involved respectively in 6.8, 5.6, and 4.7 percent of the events resulting in deaths or injuries. (Exhibit 9)

  - The next six most reported chemicals are involved in 9.0 percent of the events resulting in deaths or injuries. (Exhibit 9)

  - The next ten most reported substances are involved in 8.3 percent of the events resulting in deaths or injuries.

- Polychlorinated Biphenyls (PCBs) play a much less significant role among the death or injury events than they do among the overall events (2.8 percent versus 28 percent).

QUANTITIES INVOLVED

- More than half of incidents resulting in deaths or injuries released less than 1,000 pounds. (Exhibit 10)
- Events involving releases greater than 100,000 pounds account for almost all of the quantity reported released in events resulting in deaths or injuries. (Exhibit 10)
- Few events resulting in deaths or injuries involve a substance with a reportable quantity (RQ) of one pound.1/ There is no discernible trend as to the number of events involving substances with RQs of 10, 100, 1,000, and 5,000 pounds. (Exhibit 11)
- Two hundred thirty-nine of the death or injury events involved chemicals that have been assigned an RQ. Sixty-four percent of the events involved releases exceeding the RQ. In approximately three percent of the events the quantity released exceeded 1,000 times the RQ. In 12 percent of the events the amount released was between 100 and 1,000 times the RQ. (Exhibit 12)

MECHANISMS BEHIND HUMAN CASUALTIES

Results of a preliminary analysis of the apparent cause of reported deaths or injuries are displayed in Exhibit 13. The analysis draws upon the records containing the 20 substances reportedly released in association with the greatest total number of deaths or injuries. These records account for two-thirds of the total reported injuries and three-quarters of the total reported deaths.

1/ A reportable quantity, as defined in 40 CFR 302 is "that quantity, as set forth in this part, the release of which requires notification pursuant to this part". A reportable quantity is assigned to substances designated as hazardous under sections 102(a) and 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 or under section 311(b)(2)(A) of the Clean Water Act.

The reported end effects (fire, explosion, vapor release, or spill) were used as surrogates for cause of death and injury, since most records do not contain sufficiently explicit information to make a more precise determination. Vapor releases and spills were used as indicators of toxicity as the cause of the injury or fatality, because it was reasoned that these events are more likely to lead to a toxic exposure than a fire or explosion. Individual records were examined in order to consider all recorded information while classifying events, since multiple end effects are often reported in an individual record. The classification reflects a best judgement regarding the cause of the human effects.

- Fires and explosions predominate as the cause of deaths, while toxic exposure via a spill or vapor release is nearly always associated with injuries. (Exhibit 13)

- Representative substances among the events analyzed include the following:

  - Injury Events

    - Fire or Explosion as the cause: Ammonia, Chlorine, Hydrochloric Acid

    - Toxicity as the cause: Ammonia, Chlorine, Hydrochloric Acid, Phosgene, Nitric Acid

  - Death Events

    - Fire or Explosion as the cause: Chlorine, Gasoline, Oil, Propane

    - Toxicity as the cause: Chlorine, Hydrogen Sulfide, Sodium Nitrate

CIRCUMSTANCES OF RELEASE

In-Plant Location

- Storage vessels are reported as in-plant event location almost twice as often for events resulting in deaths or injuries as for other events. (Exhibit 14)
- Operator error is reported as the attributed cause slightly more frequently for events resulting in deaths or injuries than for other events. The cause of the accidental release is unknown almost twice as frequently for events resulting in deaths or injuries as for other records. (Exhibit 15)
- Loading or unloading operations are reported slightly more frequently and steady state is reported half as frequently for events resulting in deaths or injuries than for other events. (Exhibit 16)
- Equipment failures in death or injury incidents account for approximately one-quarter of release events at most plant locations, and two-thirds at valve and pipe sites. Upset conditions represent less than five percent of release events at all locations except process vessels, at which they account for 13 percent. (Exhibit 17)
- Loading and unloading release events resulting in death or injury are six times as likely to occur at storage vessel sites as at other plant locations. Steady state release events are most likely to occur at process vessels, valves and pipes, and in "other" plant locations. (Exhibit 18)
- Spills are reported as an end effect in 54.2 percent of the events resulting in death or injury, vapor release in 52.6 percent, fire in 26.9 percent, and explosion in 23.3 percent. In events resulting in deaths, spills were reported as an end effect in 28.1 percent, vapor release in 40.6 percent, fire in 65.6 percent, and explosion in 70.3 percent. (Exhibit 19)

- Fires are reported over five times more frequently as the end effect of a release in events in which deaths or injuries result than in other events. (Exhibit 19)

- Explosions are reported over six times more frequently as an end effect of a release when deaths or injuries result than in other events. (Exhibit 19)

In-Transit Location

- In-transit incidents play a larger role in death or injury events than they do in overall events -- 35 percent versus 25 percent. (Exhibit 20)

- Truck transport represents an increased share and rail transport a decreased share for events resulting in deaths or injuries than for other in-transit events. (Exhibit 21)

- Collision is reported as in-transit cause over twice as frequently for incidents resulting in deaths or injuries than for other incidents. (Exhibit 22)

INDUSTRIES INVOLVED

- Industry sectors were identified for the responsible parties in the 468 events reporting deaths and/or injuries. Sources for this included the Dun & Bradstreet Reference Book, SRI Directory of Chemical Producers, and identifying information in each of the individual records. It was possible to assign a 4-digit Standard Industrial Classification (SIC) codes to 95 percent of the records. The reported responsible parties ranged over all sectors of the economy, with a heavy concentration in manufacturing, transportation, and wholesale and retail trade.

- When the 4,717 reported injuries are distributed among responsible parties, Petroleum Refining and Chemicals and Allied Products are associated with five percent and 29 percent of the total, respectively. The Transportation industry (mostly In-Transit, but including other Transportation Services) are associated with 36 percent of the reported injuries. "Down-stream" users of chemical products as a whole are responsible for 26 percent of the total, with Manufacturing (other than Petroleum and Chemicals) accounting for half of that amount. (Exhibit 23)

- The contribution of the Petroleum Refining and Chemicals and Allied Products sectors is more extensive in the incidents leading to the 138 reported deaths. These two sectors are involved in incidents associated with more than half the deaths. Their respective contributions are 13 and 38 percent. The Transportation industry accounts for a smaller fraction of deaths than for injuries, but remains responsible for almost one-fourth of the total. The role of "down-stream" users of chemicals also is just under one-fourth. (Exhibit 24)

- About one-third of the events with reported deaths or injuries also reported evacuations. The industry distribution of these events shows a similar pattern to the distribution of injuries, although the industry sectors "down-stream" from Petroleum and Chemicals account for a larger fraction than those two sectors combined (35 percent). Wholesale and Retail Trade and Other Services account for about the same fraction of the total as Manufacturing, other than Petroleum and Chemicals. (Exhibit 25)

- There appear to be differences among the industries in terms of the kinds of end effects reported. For most industries, events with human casualties tend to report vapor releases or spills about twice as often as fires or explosions. That is, "toxic" end effects outweigh "flammability" end effects two to one. For Agriculture, the ratio of "toxic" to "flammability" is more extreme

-- about four to one. The ratio is reversed, however, for events involving the Petroleum Refining industry -- "flammability" end effects outweigh "toxic" end effects by about three to one. (Exhibit 26)

NATURE OF ALL EVENTS

EXTENT OF DAMAGE

- Injuries are reported in 6.6 percent of the 6,928 total events. (Exhibit 5)
- Deaths are reported in only 0.9 percent of the events. (Exhibit 6)
- Evacuation is reported in only 4.9 percent of the events; however, in over 78 percent of the events it was not stated whether evacuation was required. (Exhibit 7)
- At least 217 thousand people are reported evacuated for all events in which evacuation is reported. This total excludes non-specific descriptions of number of people evacuated, such as "several people" or "all employees."
- When evacuation is reported, an average of 638 people per event are evacuated. Number of people evacuated ranges from 10 people to 20,000 people.
- Less than seven percent of the events involve property damage, while 27 percent explicitly do not. Similarly, less than three percent involve environmental damage, while 10 percent explicitly do not. However, in each case, there is a large number of events in which it was not stated whether property (66 percent) or environmental (87 percent) damaged occurred. Estimates of property damage are usually expressed in very general terms; they range up to $100 million for one event.

- One of the contributing sources (Marsh & McLennan) presented data on 64 domestic industrial accidents from 1956 to 1984 resulting in large amounts of property damage. Ten percent of the accidents were transport-related. The remaining 90 percent split evenly between the Petroleum Refining industry and the Chemicals and Allied Products industries. Estimated costs (in 1984 dollars) averaged about $30 million for each of these incidents. The worst accidents (in terms of economic costs) were four accidents in the Petroleum Refining industry with estimated costs between $70 million and $100 million each. (Exhibit 27)

CHEMICALS PARTICIPATION

- The 20 most frequently reported substances account for 57.8 percent of the data base events. (See Exhibit 8 for list of substances.)
  - PCBs are reported in 23.0 percent of the incidents. (Exhibit 28)
  - The next nine most frequently reported substances appear in 25.6 percent of the incidents. (Exhibit 28)
  - The next ten most frequently reported substances appear in 9.3 percent of the incidents.
- Half of the top 20 substances have a reportable quantity (RQ) of 1,000 pounds of more. (Exhibit 8)
- A total of 770 different substance names were recorded among the 3,121 coded records. Although some of the names were quite vague or contained apparent misspellings, it was possible to assign four-digit SIC codes to 93 percent of the substances. (Appendix C)

- Based on their 4-digit SIC codes, the substances were assigned to one of 11 major SIC groups. Forty percent of the named substances are Industrial Organics and 20 percent are Industrial Inorganics, with the remainder split among Pesticides, Plastics, Petroleum Products and other categories. (Exhibit 29)

- For total number of events in which substances are reported to have been released, Industrial Organics and Industrial Inorganics maintain about the same proportions as the count of substance names (35 percent and 21 percent). Fertilizers (12 percent), Chlorine and Alkalies (9 percent) and Plastics (8 percent) also account for significant shares. (Exhibit 30)

- Petroleum Products dominate the total quantities released (over 81 percent of total volume), Industrial Organics are second (13 percent), and Fertilizers third (2.4 percent). (Exhibit 31)

- The distribution of events with injuries is similar to that for all events. Industrial Organics and Industrial Inorganics account for about half of the events. Petroleum Products play a significantly more significant role, at 6.4 percent. The distribution is similar when number of injuries is considered. (Exhibits 32 and 33)

- Comparing the distribution of events with fatalities with that of all events, Industrial Organics maintain the same predominant position (about 40 percent), but Industrial Inorganics account for only about 10 percent. Petroleum Products, on the other hand, account for almost 15 percent of the events with fatalities, or roughly five times the rate of occurence of these products in the data base as a whole. Not surprisingly, Explosives account for a much greater share of fatalities than their contribution to events as a whole. The shares for Chlorine and Alkalies, Pesticides, and Fertilizers decline in events with fatalities. (Exhibit 34).

QUANTITIES INVOLVED

- Quantity released is identified in 75.2 percent of the events. In 38.1 percent of the events for which the quantity released is identified, the release size exceeds 1,000 pounds. (Exhibit 35)

- Releases of over 100,000 pounds occur in less than 2.5 percent of the events, but account for 93.2 percent of the total quantity of material reported released in the data base. The largest release reported was 266 million pounds, and 2,569 releases between 10 and 1,000 pounds were reported. (Exhibit 35)

- All but one (Sodium Hydroxide) of the ten most frequently reported substances are on average released in quantities lower than the average quantity released for all substances. (Exhibit 36)

MEDIA AFFECTED

- In 81.8 percent of the events, at least one of the substances released is a liquid; in 15.5 percent of the events, at least one of the substances released is a gas; and in 3.3 percent of the events at least one of the substances released is a solid. If PCBs are excluded, the distribution is 75.5 percent liquid, 20.9 percent gas, and 4.5 percent solid. (Exhibit 37)

- Air is affected in approximately 30 percent of the events and not affected in 5 percent; water is affected in 15 percent and not affected in 41 percent; and land is affected in 53 percent and not in 13 percent. There is a large percentage of events in which it is not specified whether a particular media was affected: 65 percent for air, 44 percent for water, and 34 percent for land.

CIRCUMSTANCES OF RELEASE

- Three quarters of the events occur at a plant location; the remainder occur during transit. If PCBs are excluded, 66 percent are in-plant and 34 percent are in-transit.

IN PLANT LOCATION

- Spill is reported as an end-effect in 71.7 percent of the events; vapor release in 25.8 percent; fire in 5.0 percent; and explosion in 3.6 percent. Excluding the PCB events, the proportions are: spills, 67.8 percent; vapor releases, 33.1 percent; fire, 5.9 percent; and explosion, 4.1 percent. Note that multiple end-effects may be reported; therefore, percents will not total to 100 percent. (Exhibit 38)

- The estimated severity of end effects was estimated to be (in order of decreasing severity) explosion, fire, vapor release, spill, other, and unknown. A majority of the events (61.8 percent) report spill as the worst end effect occurring. Another 23.7 percent of the events report vapor release as the most severe end effect occurring. Only 3.7 and 2.8 percent of the events, respectively, report explosion or fire as the worst end effect occurring.

- Storage vessels, process vessels, and valves or piping account for approximately equal shares of in-plant events. (Exhibit 14)

- Storage vessels account for 86.6 percent of the quantity released. However, when deaths or injury are involved, "other" locations (transformers, capacitors, scrubbers, other air pollution control equipment, etc.) account for 87.5 percent of the quantity released. (Exhibit 39)

- Equipment failure is identified as the cause of 43.3 percent of the number of the events occurring in-plant (Exhibit 15). However, "other" causes (corrosion, power failure, vandalism, pollution control equipment down for maintenance, etc.) account for 80.8 percent of the quantity released. (Exhibit 40)

- In-plant events primarily occur under steady state conditions (30.6 percent) or during loading or unloading operations (15.1 percent). Operational configuration is not reported for about half the incidents. (Exhibit 16)

- In-plant locations have similar patterns of event causes, with three notable exceptions: valve and pipe locations are more frequent for equipment failures, storage locations are more frequent for operator causes, and process vessel locations are more frequent for process upset causes. (Exhibit 41)

- Steady state incidents occur most frequently for all in-plant locations, except storage. Loading and unloading incidents are the most frequent contributors to storage mishaps. (Exhibit 42)

- The majority of the incidents involving process vessels, "other" locations, or unknown locations release less than 1,000 pounds of material; while the majority of incidents involving storage vessels or valves and pipes release more than 1,000 pounds of material. (Exhibits 43, 44, 45, 46, and 47)

- Ten percent of the in-plant events account for over 97 percent of the amount released. Those events greater than 100,000 pounds in release size (2.5 percent of in-plant events) account for 93 percent of the quantity released.

- Events involving releases over 100,000 pounds account for the majority of material released for all locations except valves and pipes and unknown location. (Exhibits 43, 44, 45, 46, and 47)

- The majority of events attributed to all causes except operator error release less than 1,000 pounds. The majority of events attributed to operator error release over 1,000 pounds. (Exhibits 48, 49, 50, 51, 52, and 53)

- Events involving releases over 100,000 pounds account for the majority of material released for all causes except fire. Events involving releases of 50,000 to 100,000 pounds account for most of the material released when fire is the cause. (Exhibits 48, 49, 50, 51, 52, and 53)

- In 2.2 percent of the events, high temperature is reported as a contributing factor. However, in 81.7 percent of the events it is not stated whether high temperature was a contributing factor.

- In 3.5 percent of the events, high pressure is reported as a contributing factor. In 80.8 percent of the events, it is not stated whether high pressure was a contributing factor.

IN-TRANSIT LOCATION

- In-transit events account for 25.2 percent of the events. (Exhibit 20)

- Most in-transit events (54.5 percent) involve trucks; another 36.1 percent involve rail cars. (Exhibit 21)

- Of the releases of hazardous materials during transportation, 38.4 percent are the result of a leak, and 20.3 percent are the result of a collision. (Exhibit 22)

- Over half of the events for each transit mode, except pipelines, release less than 1,000 pounds. The majority of events occurring in pipelines release over 1,000 pounds. (Exhibits 54, 55, 56, 57 and 58)

- The quantity reported released in events occurring in pipelines accounts for 58.8 percent of the total quantity released in in-transit events. However, the bulk of this was contributed by three large pipeline spills; otherwise, pipelines are responsible for only a small fraction of release events and quantities. The quantities reported released in truck and rail events respectively account for 17.4 and 16.1 percent of the total quantity reported released in in-transit events. (Exhibit 59)

- Events involving releases over 100,000 pounds account for almost all of the quantity reported released in pipeline and barge events. In rail events, incidents involving over 50,000 pounds account for nearly all the quantity reported released. (Exhibits 55, 56, and 57)

- Over one-quarter of the rail releases are in the 100 to 1,000 pound range, yet about the same number of events are in the 10,000 to 100,000 pound range, i.e., 100 times as large. (Exhibit 55)

- In events involving "other" transit modes (usually airplanes) no events are reported with quantities over 10,000 pounds. (Exhibit 58)

LARGE SCALE ATMOSPHERIC RELEASES OF ACUTELY TOXIC CHEMICALS

The AHE Data Base was developed to support EPA review of public and worker safety relative to accidental release of acutely toxic chemicals. The assembled AHE Data Base was subsequently analyzed to assess the extent to which historical U.S. release events correspond to the situation that occured in Bhopal, India. It was found that no U.S. incident in the data base closely corresponds to the Bhopal incident, and that the general character of U.S. release events differs from that observed in Bhopal. Significant aspects of the incident in Bhopal, and attributes of AHE Data Base incidents are as follows:

- In Bhopal, an estimated 80,000 pounds of methyl isocyanate and reaction products was released from a storage vessel over an approximately two-hour period. Although the causes of the accident have not been clearly identified, several factors appear to have contributed. These include: operator error, equipment failure, and upset condition. The end effect of the incident was a vapor release resulting in the deaths of over 2,000 people.

- In comparison, 11 deaths is the maximum number attributable to a single incident in the AHE Data Base. None of the seven incidents in the AHE Data Base that lead to five or more deaths involve highly toxic materials. As shown in Exhibit 13, nearly all (92 percent) of the deaths are associated with fires and/or explosions rather than with toxic chemicals.

- Only 3 percent of the AHE Data Base events for which quantity is identified involve releases that exceed 80,000 pounds. These large-scale releases account for 5.7 percent of the death or injury events. None of the large release events involve a toxic chemical release that results in a fatality.

- Approximately 30 percent (25 events) of the large-scale events (those releasing at least 80,000 pounds of materials) involve acutely toxic substances. About half of these large-scale acutely toxic releases involve the formation of a vapor cloud. The other events release either unknown substances, less toxic materials, or fire and explosion hazards.

- One-fifth of the large-scale acutely toxic release led to one or more injuries. The total number of injuries for these events was reported to be 429, which includes one transportation event that reportedly injured 343 people and led to the evacuation of 17,000.

- Less than three percent of the events involve a storage vessel and result in a vapor release. Four percent involved a storage vessel and are caused by operator error. Less than two percent of the events are caused by operator error and result in a vapor release.

- Less than one percent of the events involve a storage vessel, result in a vapor release, and are caused by operator error.

Exhibit 1

DATA SOURCES FOR THE AHE DATA BASE

	Number of Records	Period
National Data Sources		
National Response Center	1,225 *	1983-84
United Press International	139	1983-85
New York Times	46	1980-84
Marsh & McLennan	64	1956-84
	1,474	
Regional Data Sources		
Region 7 EPA	513	1981-85
New Orleans Times-Picayunne	65	1980-81
Los Angeles Times	28	1980-84
Chicago Tribune	12	1980-81
	618	
State Data Sources		
Texas Air Control Board	442	1980-85
Ohio EPA	263	1981-85
New Jersey Department of Environmental Quality	116	1983-85
California:		
Office of Emergency Services	141	1984-85
Highway Patrol	67	1983-85
	1,029	
TOTAL	3,121 *	

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* *National Response Center (NRC) data included 5,032 accidental releases of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) chemicals during 1983 and 1984. Of these, the 802 events designated as air releases were all included in the AHE Data Base. One-tenth of the remaining 4,230 events were randomly selected for inclusion in the AHE Data Base. As a result, the 1,225 NRC-origin records in the AHE Data Base represent 5,032 events; and the 3,121 total records in the AHE Data Base represent 6,928 incidents.*

Exhibit 2

DISTRIBUTION OF EVENTS BY SOURCE AND YEAR

Source	Before 1980	1980	1981	1982	1983	1984	First Half 1985	Total
National Response Center	--	--	--	--	539	679	7	1225
United Press International	--	--	--	1	56	48	34	139
Marsh & McLennan	48	5	1	3	4	3	--	64
EPA Region 7	1	1	101	144	108	107	51	513
Newspapers:								
Los Angeles Times	1	5	8	10	3	1	--	28
New Orleans Times-Picayunne	--	31	34	--	--	--	--	65
Chicago Tribune	--	7	5	--	--	--	--	12
New York Times	--	10	19	12	4	1	--	46
Subtotal	1	53	66	22	7	2	0	151
States:								
Calif. Office of Emergency Services	--	--	--	--	--	119	22	141
California Highway Patrol	--	--	--	--	32	32	3	67
Texas Air Control Board	--	19	66	64	57	127	109	442
Ohio EPA	--	--	1	77	59	103	23	263
New Jersey Department of Environmental Quality	--	--	--	1	46	36	33	116
Subtotal	0	19	67	142	194	417	190	1,029
TOTAL	50	78	235	312	908	1,256	282	3,121

Exhibit 3

NUMBER OF EVENTS IN DATABASE

By Source of Event

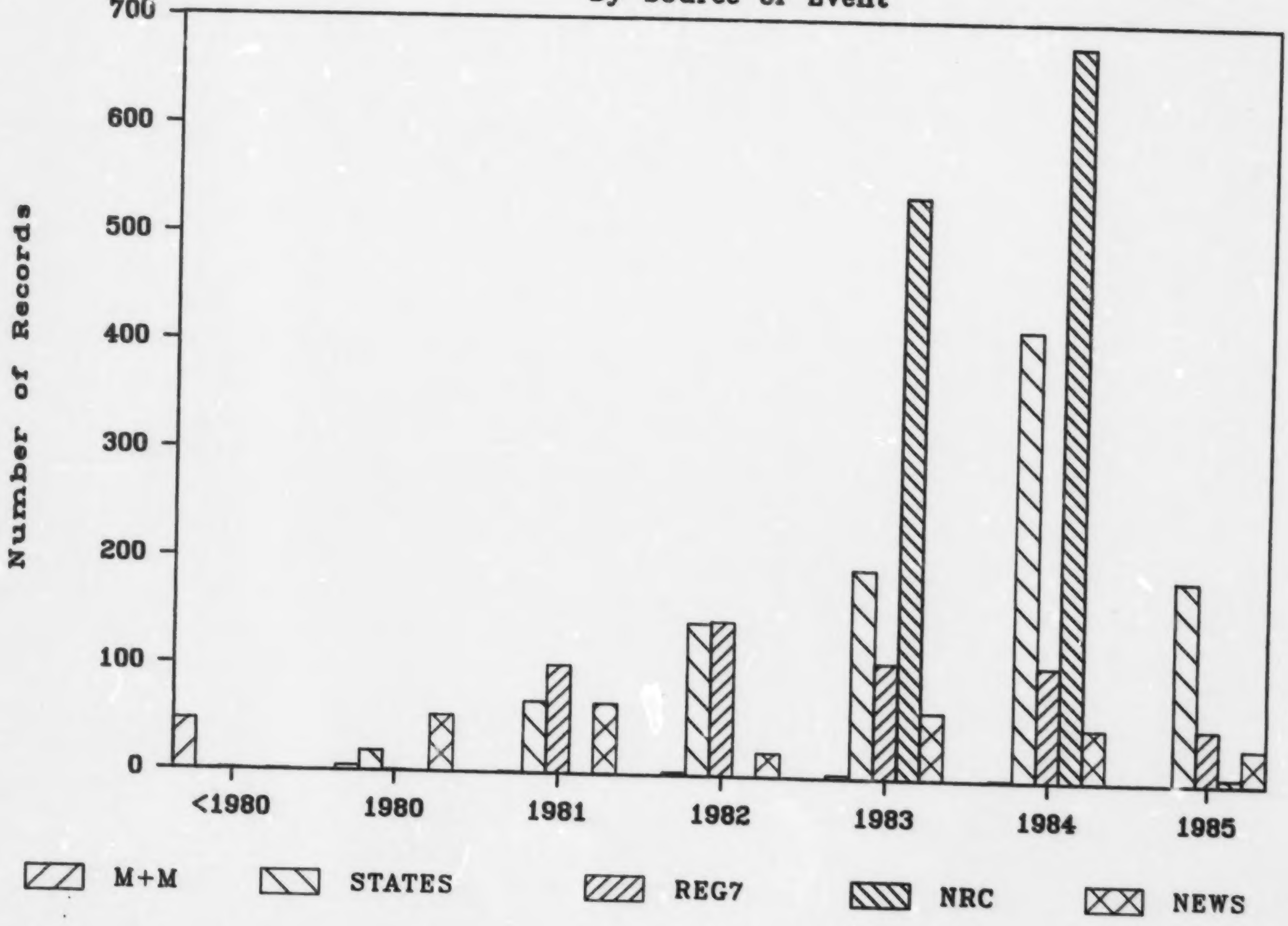


Exhibit 4

NUMBER OF EVENTS IN DATABASE

News Sources of Events

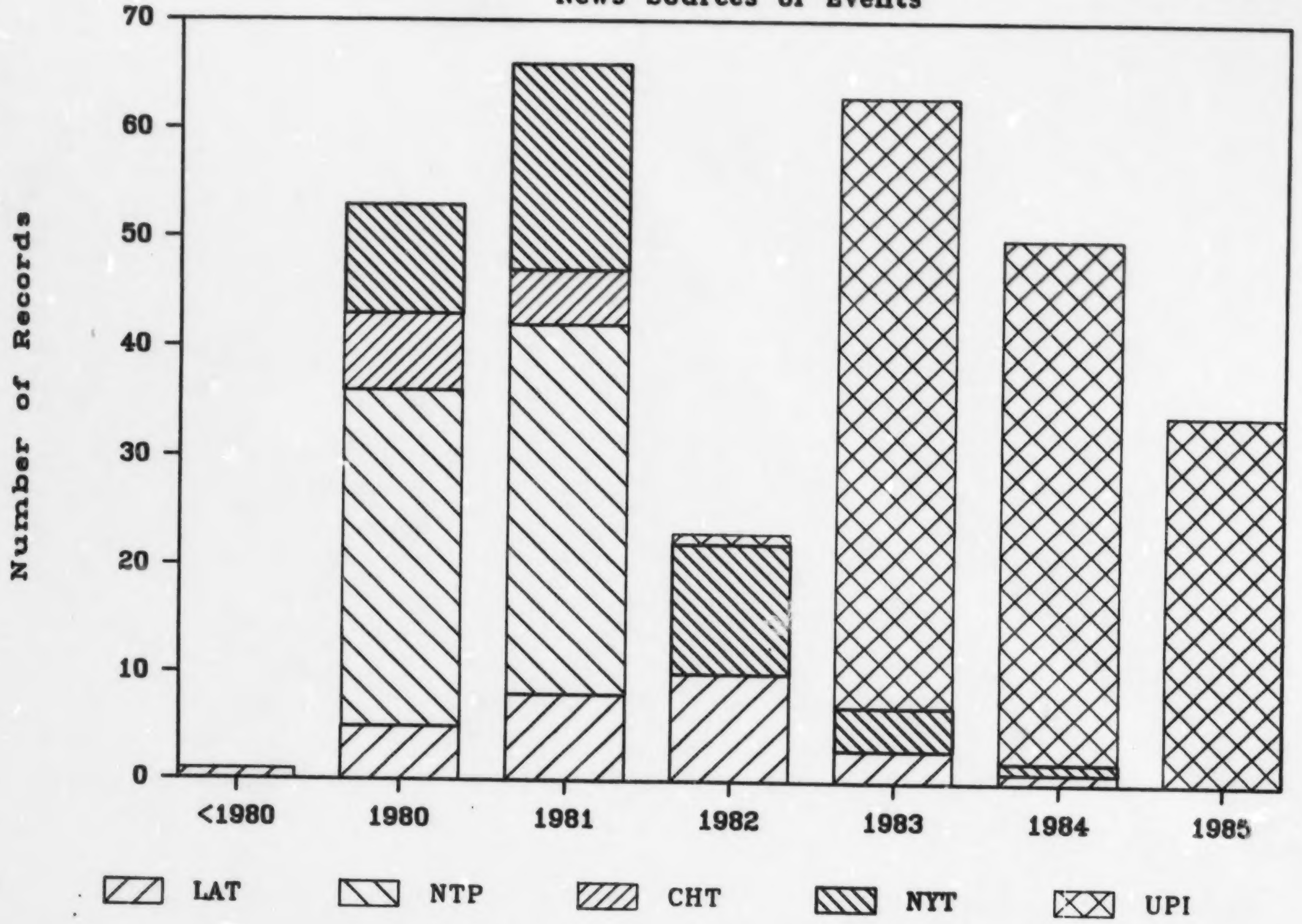
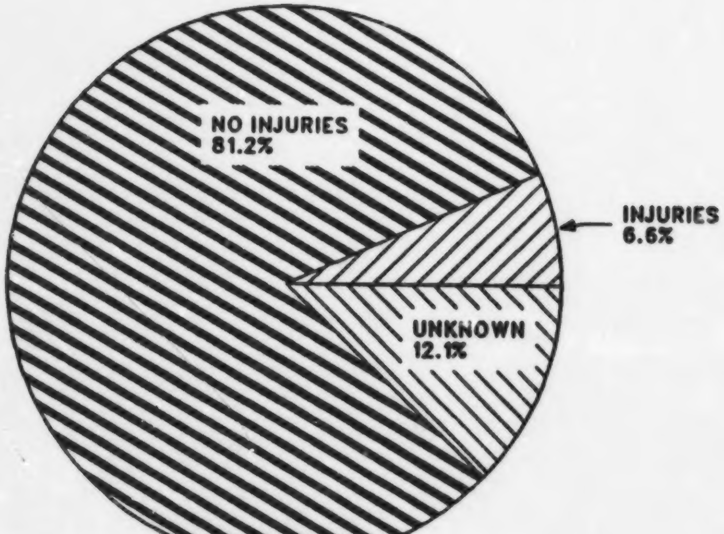


Exhibit 5

ACUTE HAZARDOUS EVENTS DATABASE

OCCURRENCE OF INJURIES

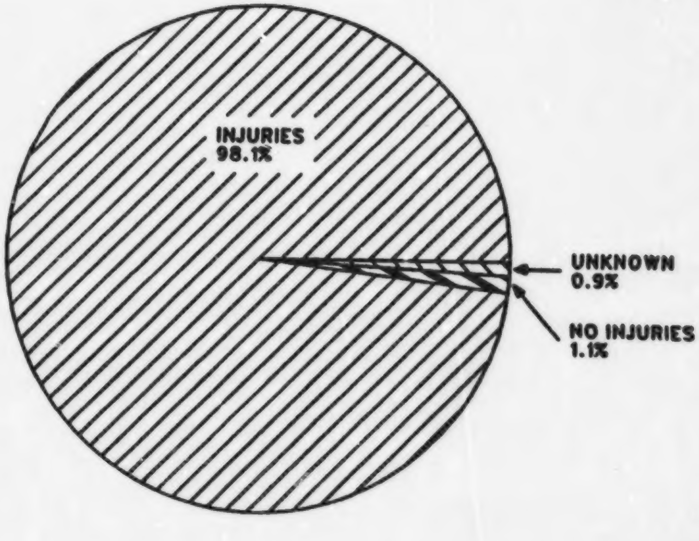
ALL EVENTS



NUMBER OF EVENTS = 6928

OCCURRENCE OF INJURIES

DEATH/INJURY EVENTS



NUMBER OF EVENTS = 468

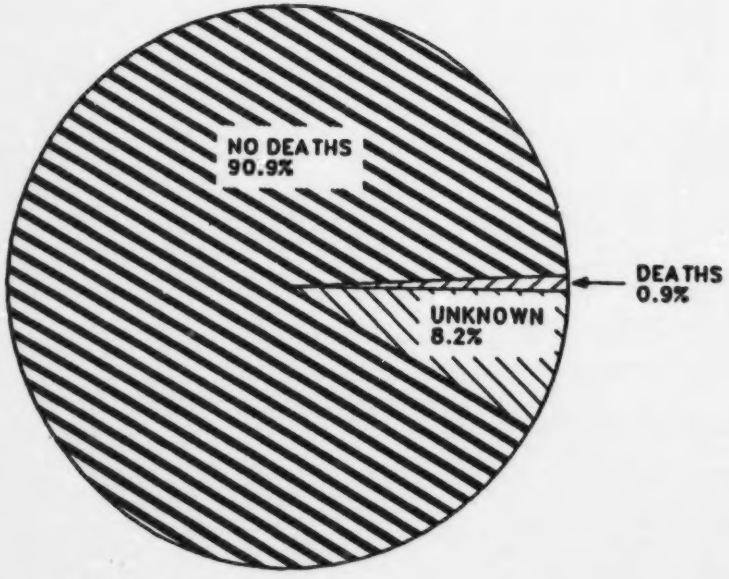
IEc/MTDS

Exhibit 6

ACUTE HAZARDOUS EVENTS DATABASE

OCCURRENCE OF DEATHS

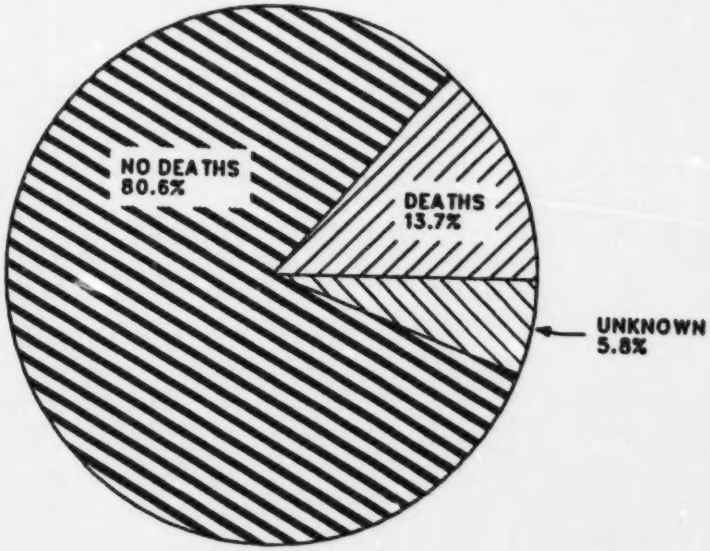
ALL EVENTS



NUMBER OF EVENTS = 6928

OCCURRENCE OF DEATHS

DEATH/INJURY EVENTS



NUMBER OF EVENTS = 468

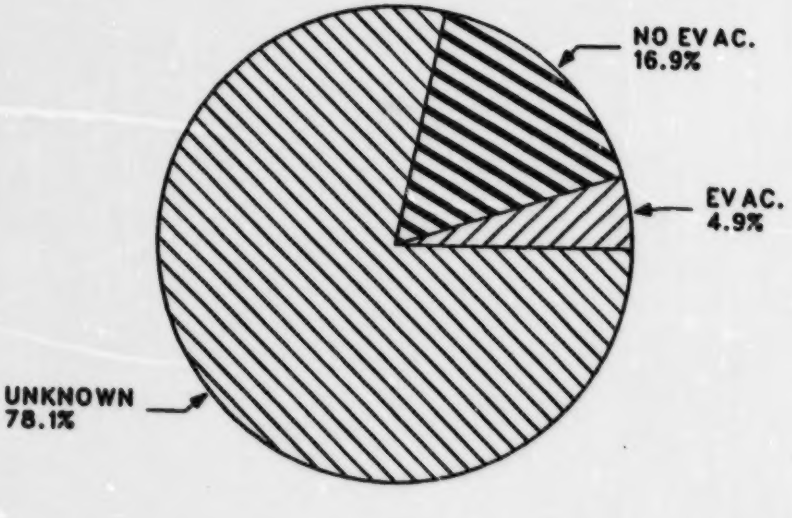
IEc/MTDS

Exhibit 7

ACUTE HAZARDOUS EVENTS DATABASE

OCCURRENCE OF EVACUATIONS

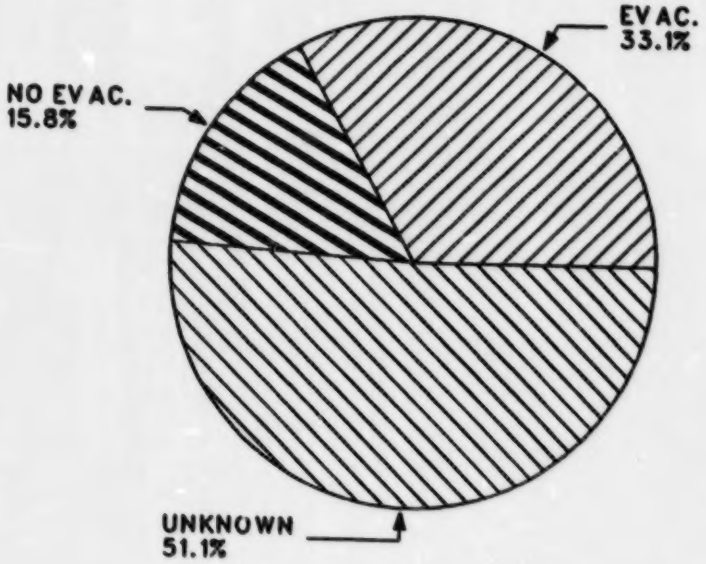
ALL EVENTS



NUMBER OF EVENTS = 6928

OCCURRENCE OF EVACUATIONS

DEATH/INJURY EVENTS



NUMBER OF EVENTS = 468

IEc/MTDS

Exhibit 8

TWENTY MOST FREQUENTLY REPORTED SUBSTANCES

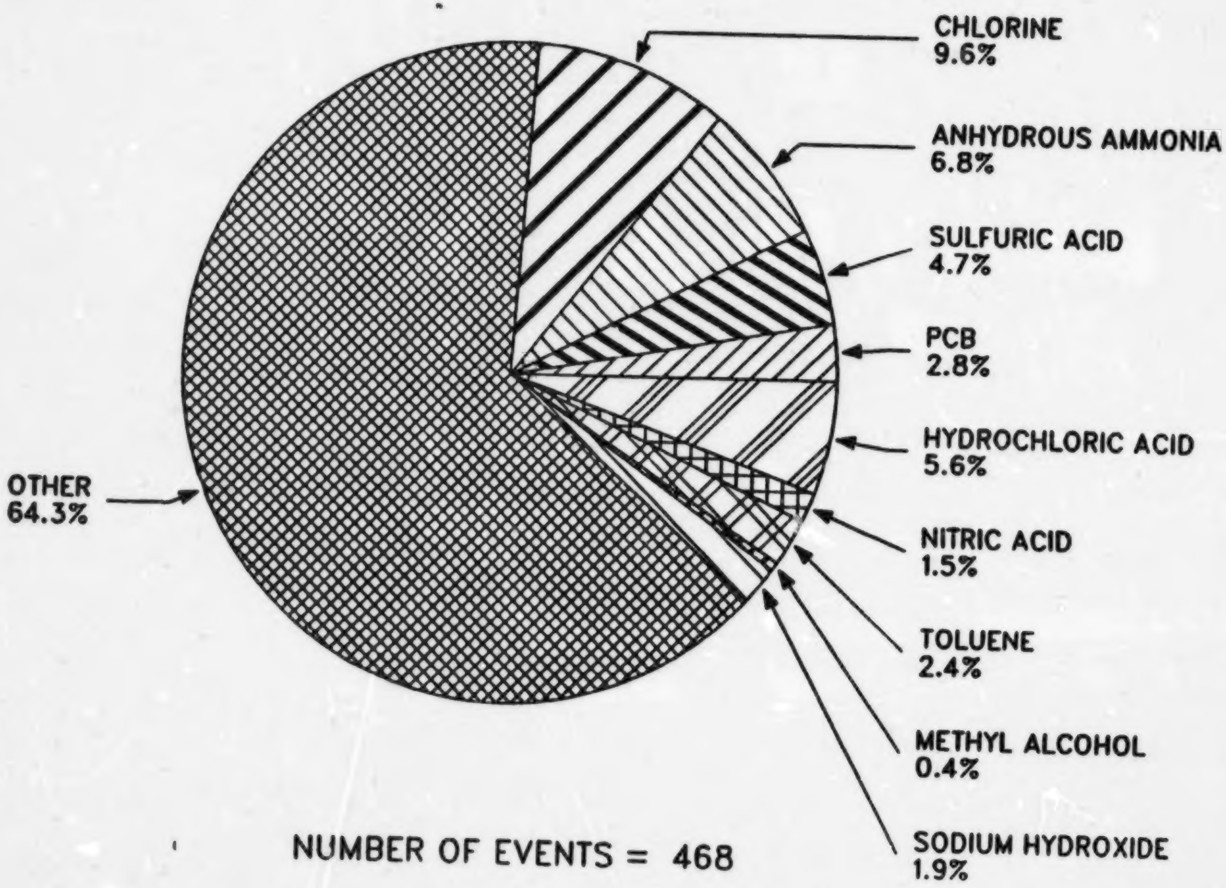
Substance	Reportable Quantity (RQ) (lbs)
Polychlorinated Biphenyls (PCBs)	10
Sulfuric Acid	1000
Anhydrous Ammonia	100
Chlorine	10
Hydrochloric Acid	5000
Sodium Hydroxide	1000
Methyl Alcohol	5000
Nitric Acid	1000
Methyl Chloride	1
Toluene	1000
Vinyl Chloride	1
Fertilizer	N/A
Solvent	N/A
Phosphoric Acid	5000
Benzene	1000
Ethylene Dichloride	100
Styrene	1000
Hydrogen Sulfide	100
Tetrachloroethylene	1
Sulfur Dioxide	N/A

Note: N/A means a reportable quantity was not available for that substance.

Exhibit 9

ACUTE HAZARDOUS EVENTS DATABASE
DISTRIBUTION OF EVENTS BY CHEMICAL FOR DEATH/INJURY EVENTS

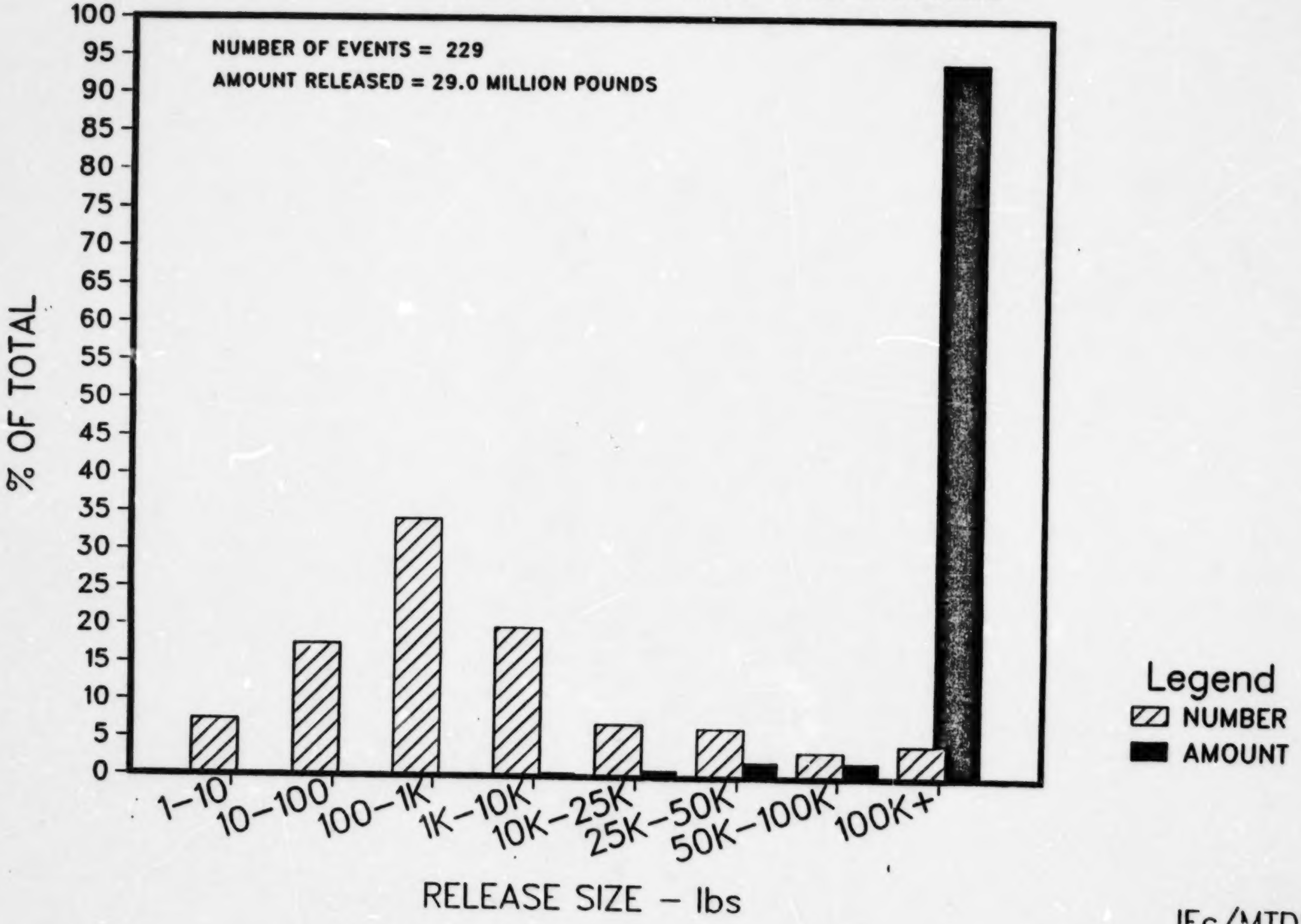
10 CHEMICALS REPRESENTING THE LARGEST NUMBER OF TOTAL EVENTS



IFc/MTDS

Exhibit 10

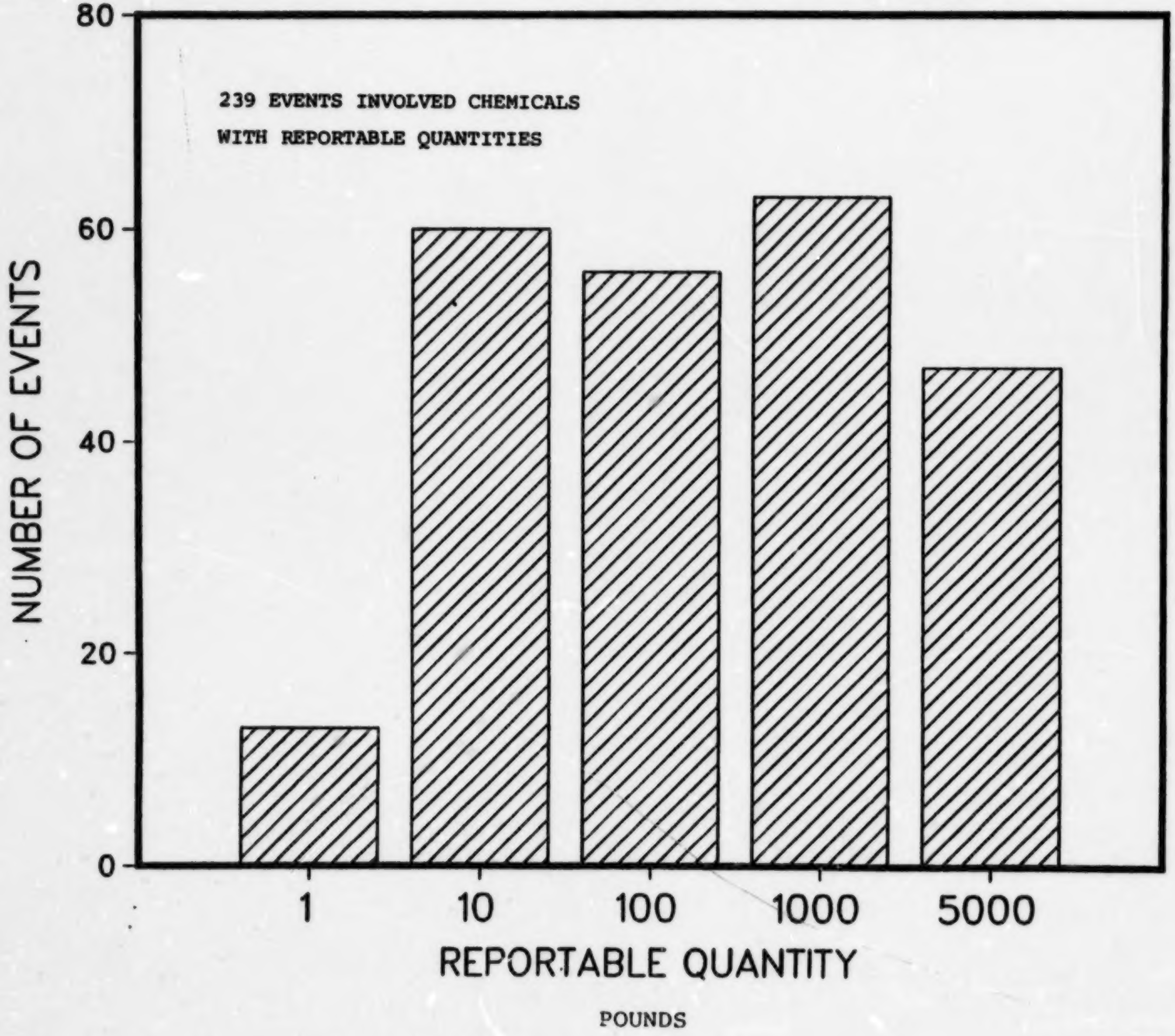
ACUTE HAZARDOUS EVENTS DATABASE FREQUENCY DISTRIBUTION BY RELEASE SIZE FOR EVENTS INVOLVING DEATHS AND INJURIES



IEc/MTDS

Exhibit 11

ACUTE HAZARDOUS EVENTS DATABASE
NUMBER OF EVENTS BY REPORTABLE QUANTITY FOR DEATH AND INJURY EVENTS



IEc/MTDS

Exhibit 12

ACUTE HAZARDOUS EVENTS DATABASE
QUANTITY RELEASED/REPORTABLE QUANTITY
FOR DEATH AND INJURY EVENTS

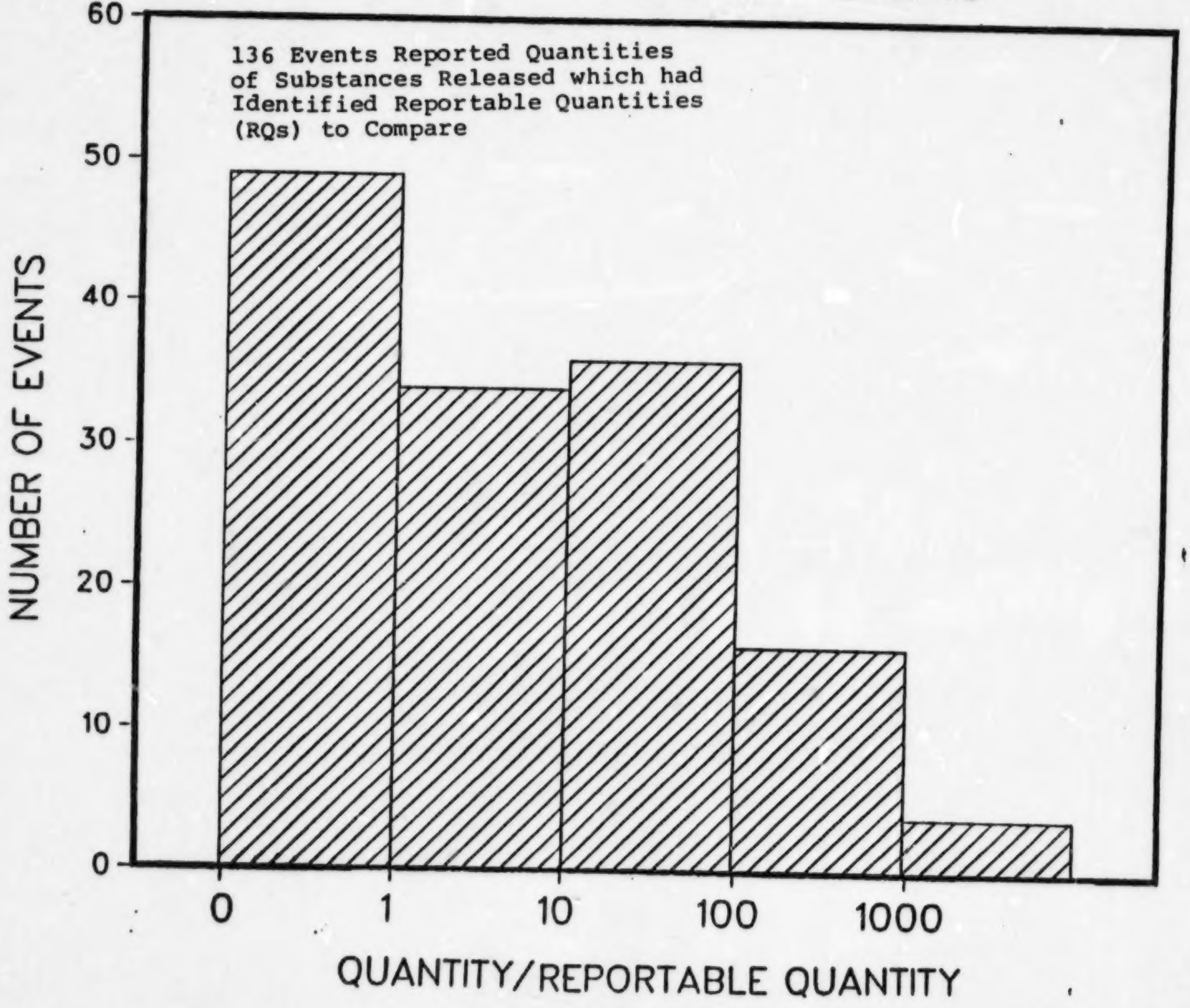

136 Events Reported Quantities
of Substances Released which had
Identified Reportable Quantities
(RQs) to Compare

Exhibit 13

ROLE of FIRE/EXPLOSION vs TOXICITY

As Apparent Cause of Deaths or Injuries

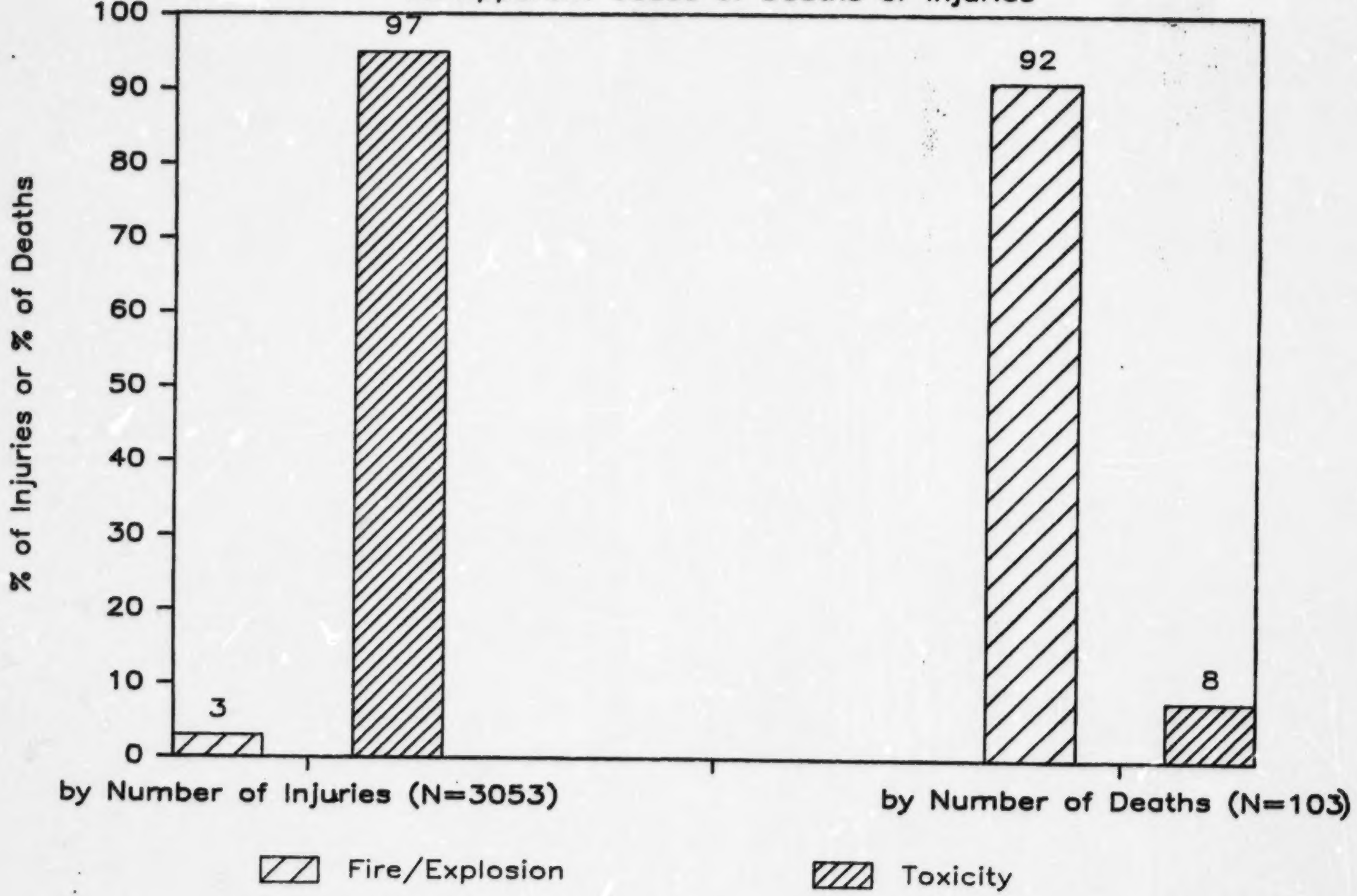
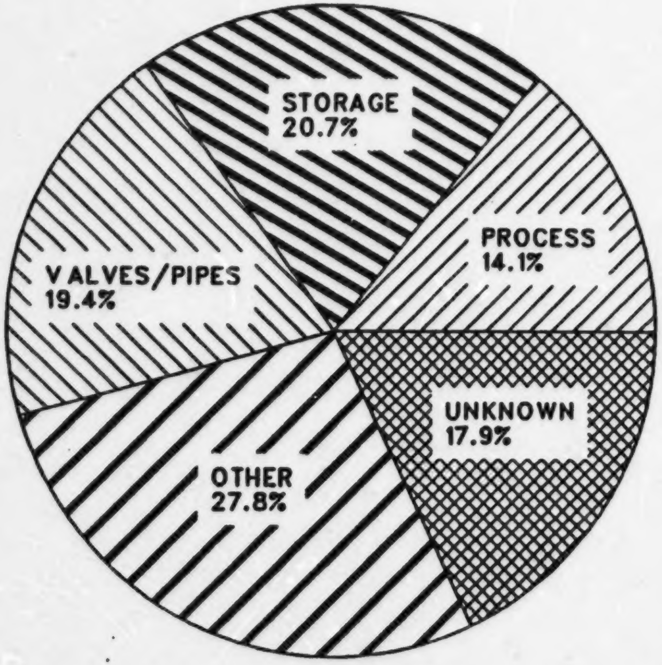


Exhibit 14

ACUTE HAZARDOUS EVENTS DATABASE

IN–PLANT EVENTS BY LOCATION

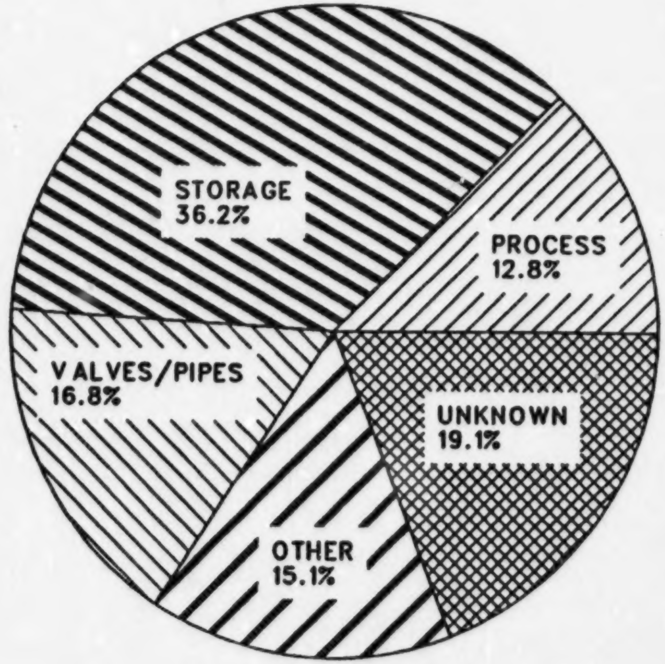
ALL EVENTS



NUMBER OF EVENTS = 5179

IN–PLANT EVENTS BY LOCATION

DEATH/INJURY EVENTS



NUMBER OF EVENTS = 304

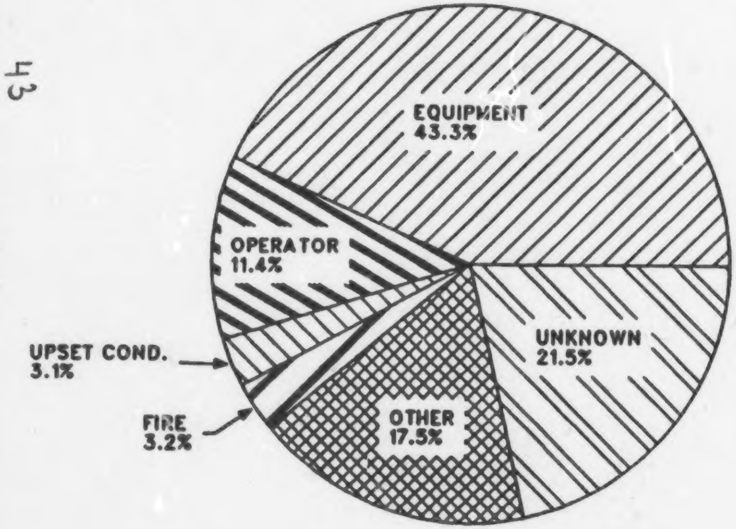
IEc/MTDS

Exhibit 15

ACUTE HAZARDOUS EVENTS DATABASE

IN-PLANT EVENTS BY CAUSE

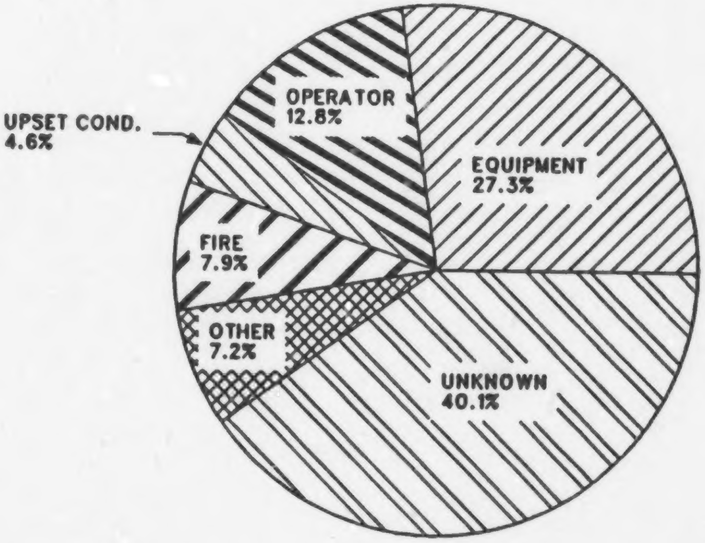
ALL EVENTS



NUMBER OF EVENTS = 5179

IN-PLANT EVENTS BY CAUSE

DEATH/INJURY EVENTS



NUMBER OF EVENTS = 304

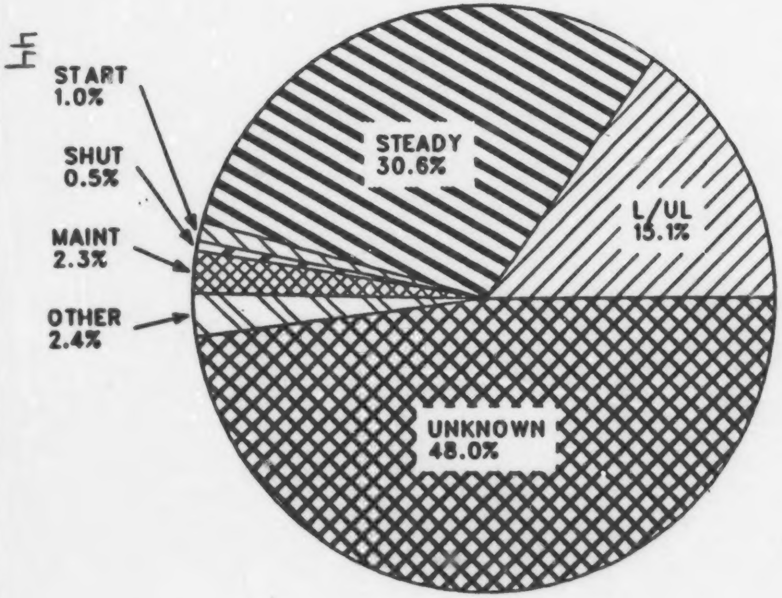
IEc/MTDS

Exhibit 16

ACUTE HAZARDOUS EVENTS DATABASE

IN-PLANT EVENTS BY CONFIGURATION

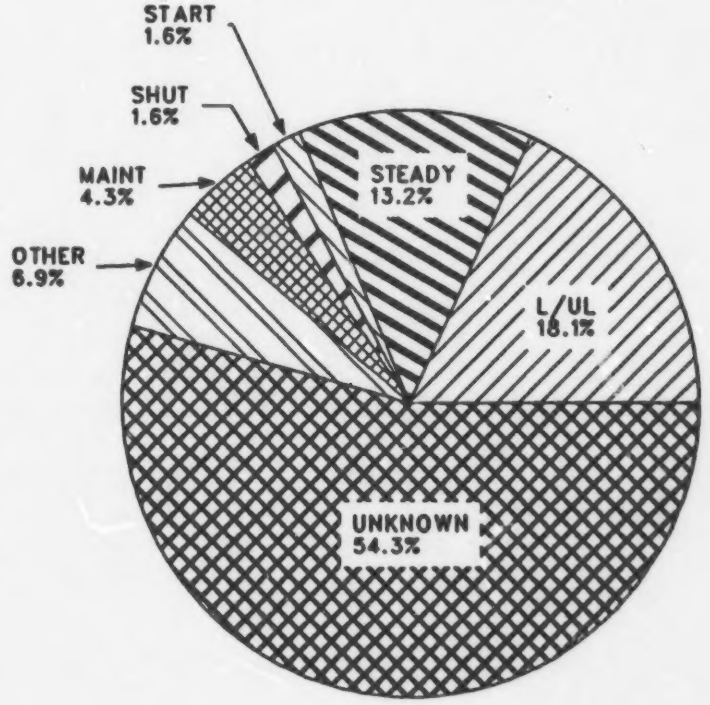
ALL EVENTS



NUMBER OF EVENTS = 5179

IN-PLANT EVENTS BY CONFIGURATION

DEATH/INJURY EVENTS

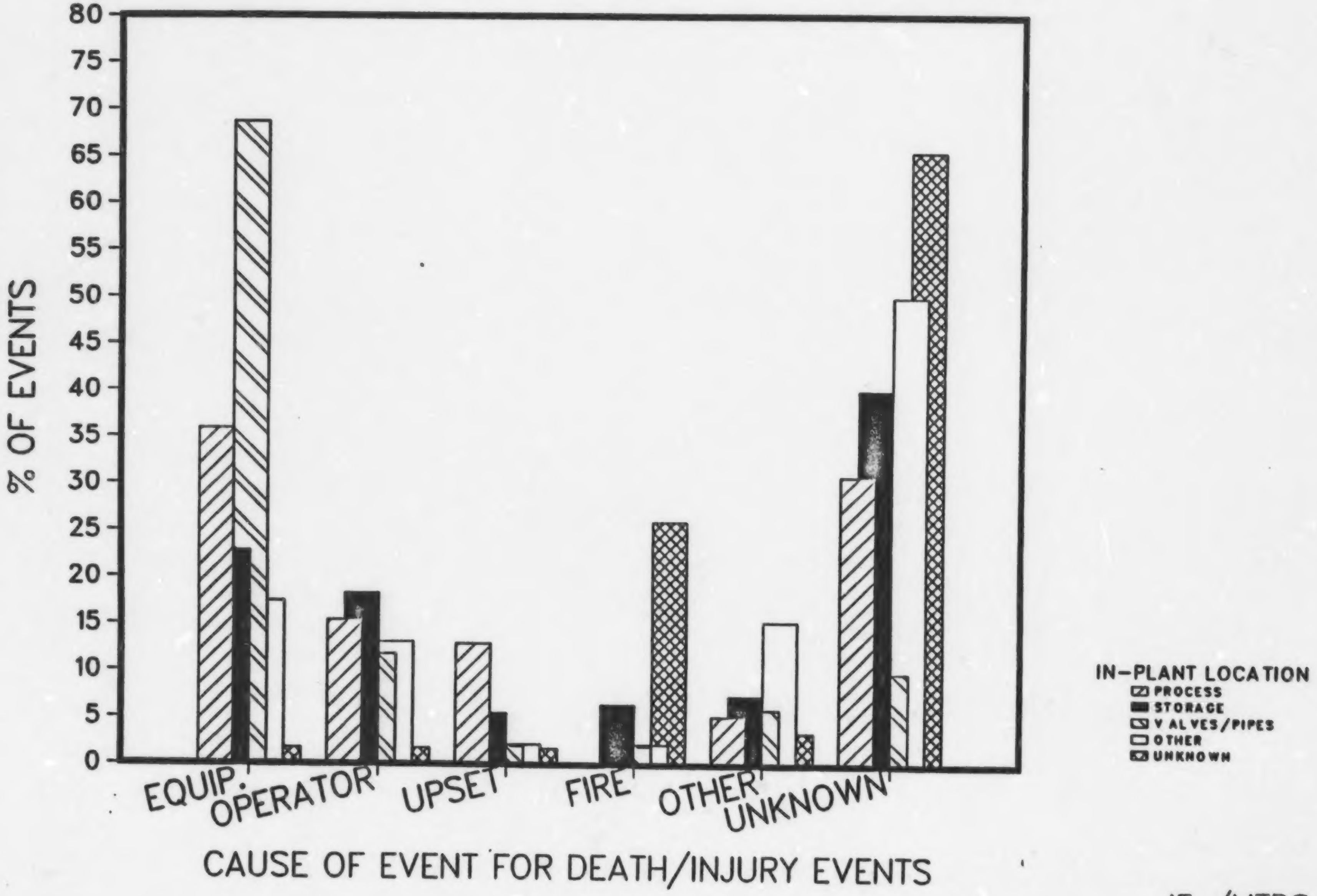


NUMBER OF EVENTS = 304

IEc/MTDS

Exhibit 17

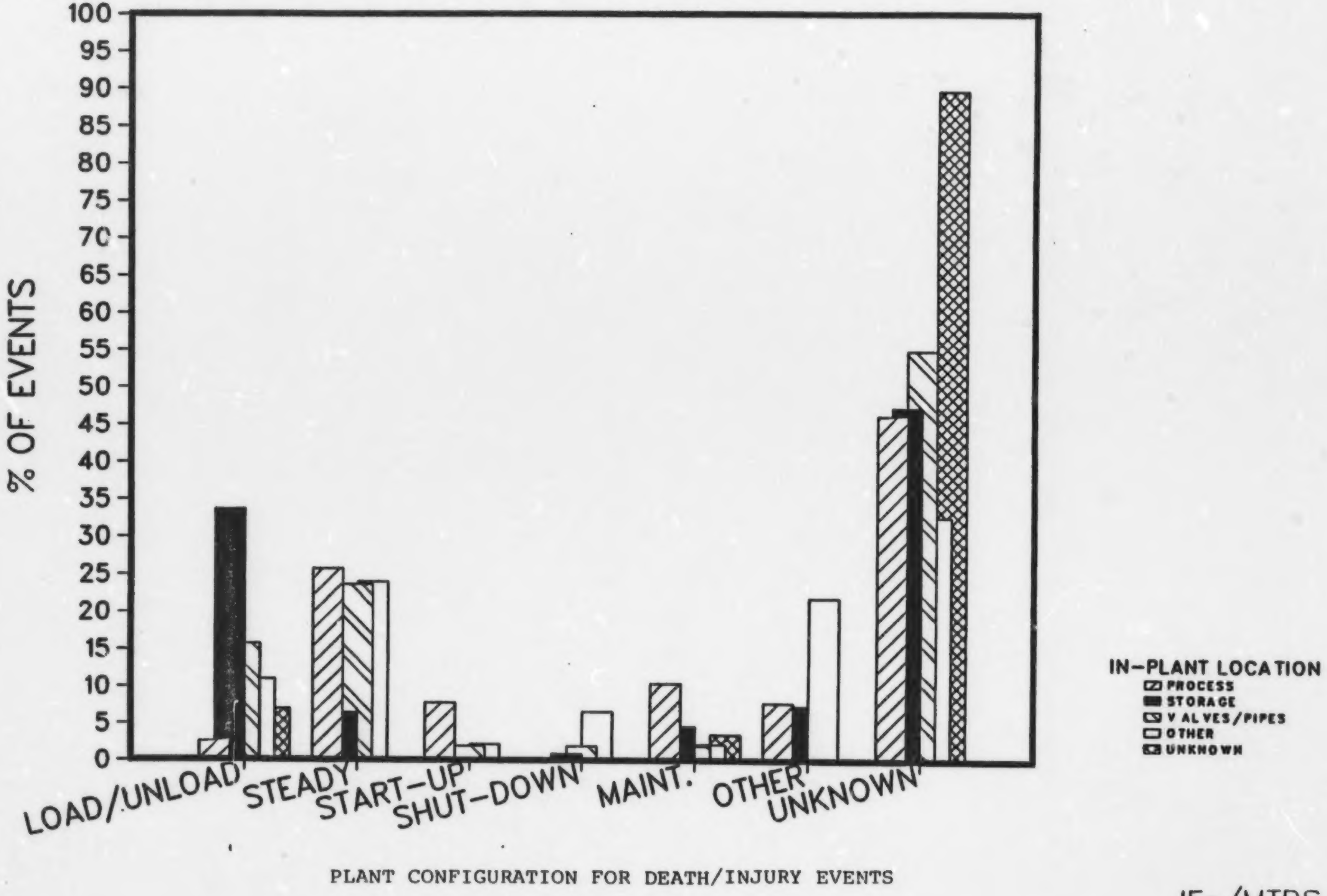
ACUTE HAZARDOUS EVENTS DATABASE
IN-PLANT EVENTS BY CAUSE AND LOCATION



IEc/MTDS

Exhibit 18

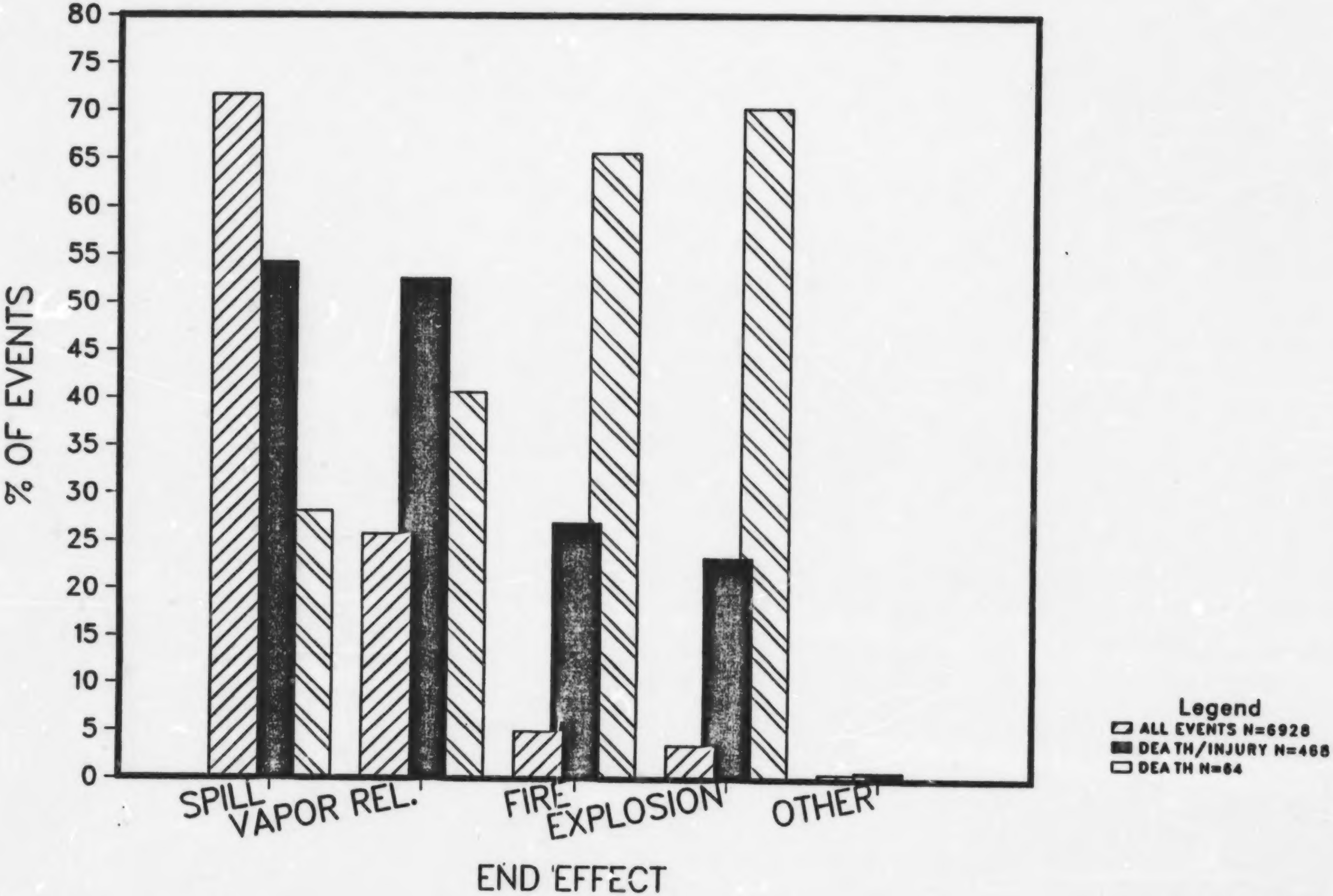
ACUTE HAZARDOUS EVENTS DATABASE
IN-PLANT EVENTS BY CONFIGURATION AND LOCATION



IEc/MTDS

Exhibit 19

ACUTE HAZARDOUS EVENTS DATABASE FREQUENCY OF REPORTED END EFFECTS



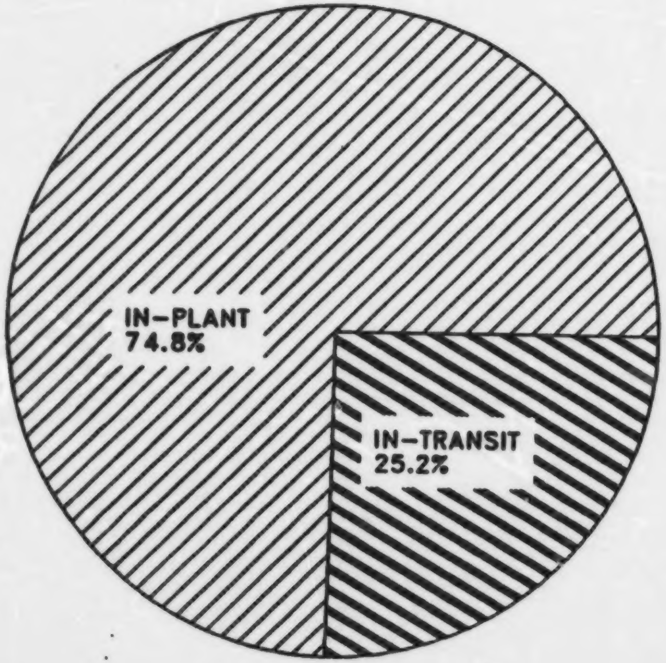
IEc/MTDS

Exhibit 20

ACUTE HAZARDOUS EVENTS DATABASE

IN–PLANT VS. IN–TRANSIT EVENTS

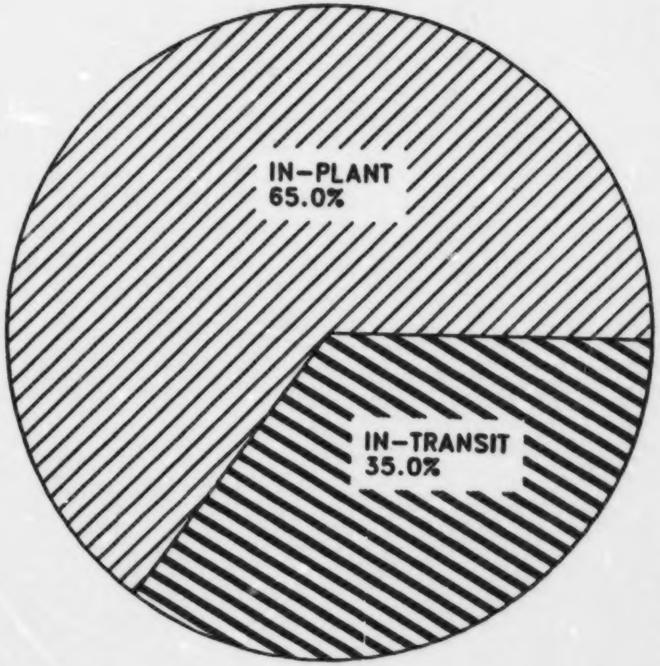
ALL EVENTS



NUMBER OF EVENTS = 6928

IN–PLANT VS. IN–TRANSIT EVENTS

DEATH/INJURY EVENTS



NUMBER OF EVENTS = 468

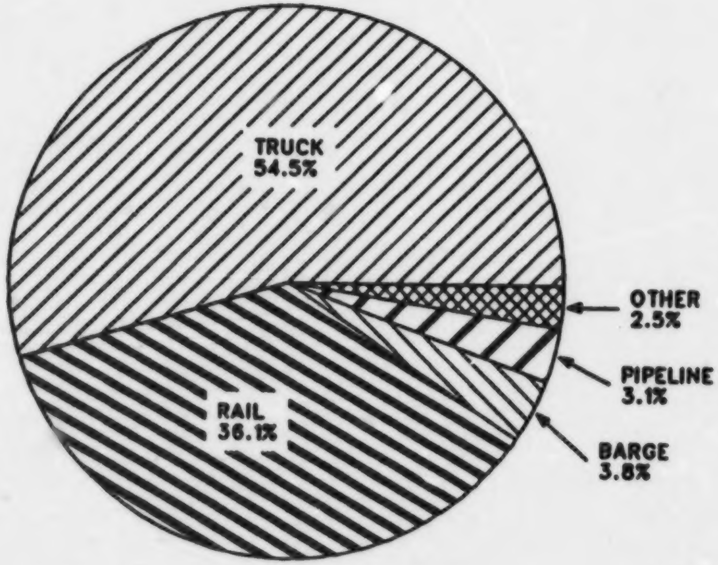
IEc/MTDS

Exhibit 21

ACUTE HAZARDOUS EVENTS DATABASE

IN–TRANSIT EVENTS BY MODE

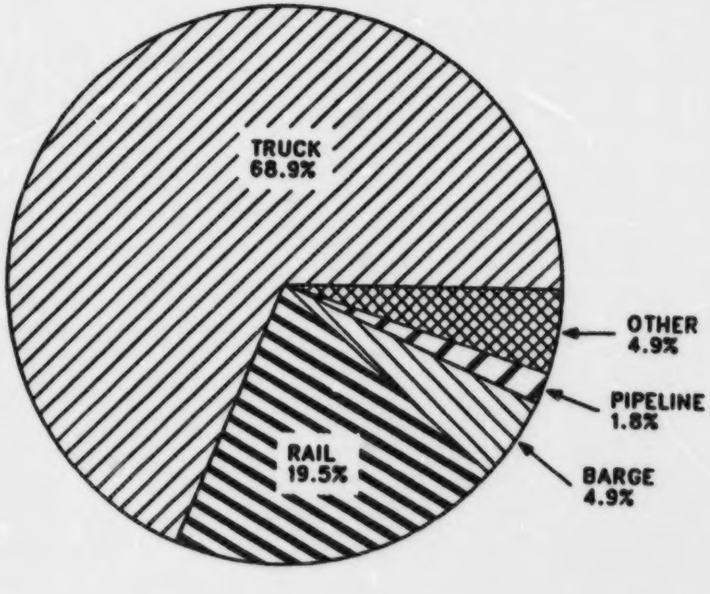
ALL EVENTS



NUMBER OF EVENTS = 1749

IN–TRANSIT EVENTS BY MODE

DEATH/INJURY EVENTS



NUMBER OF EVENTS = 164

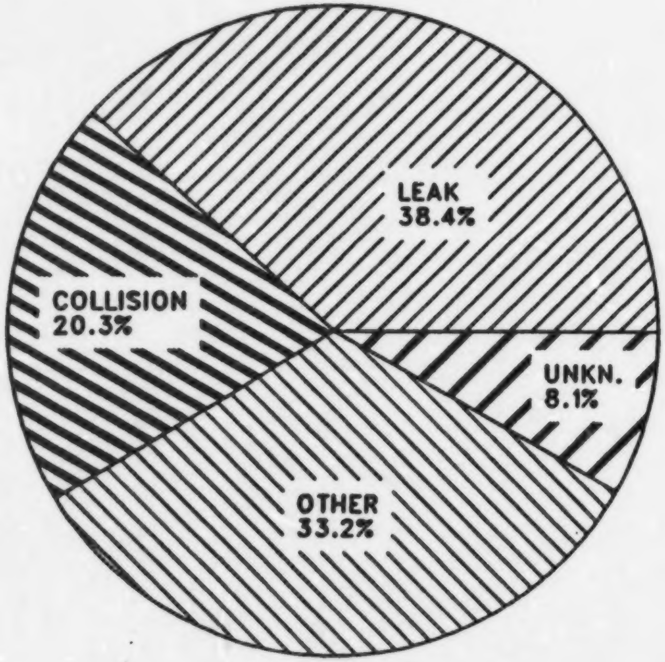
IEc/MTDS

Exhibit 22

ACUTE HAZARDOUS EVENTS DATABASE

IN—TRANSIT EVENTS BY CAUSE

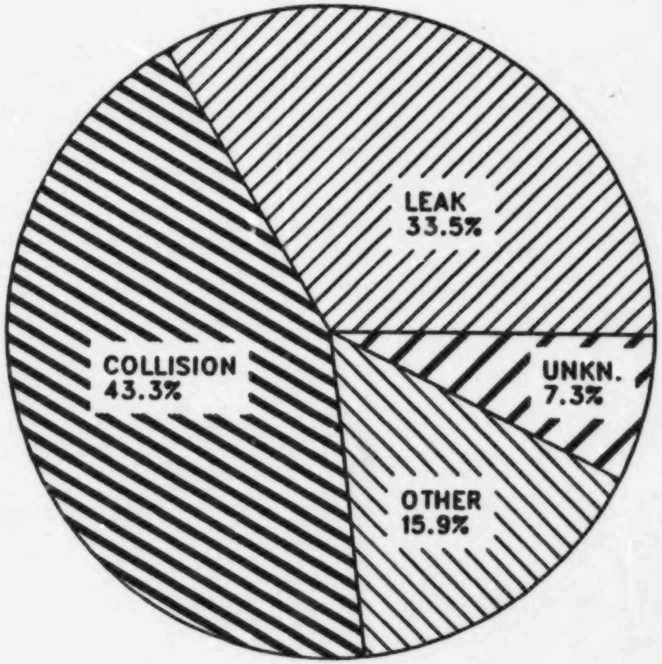
ALL EVENTS



NUMBER OF EVENTS = 1749

IN—TRANSIT EVENTS BY CAUSE

DEATH/INJURY EVENTS



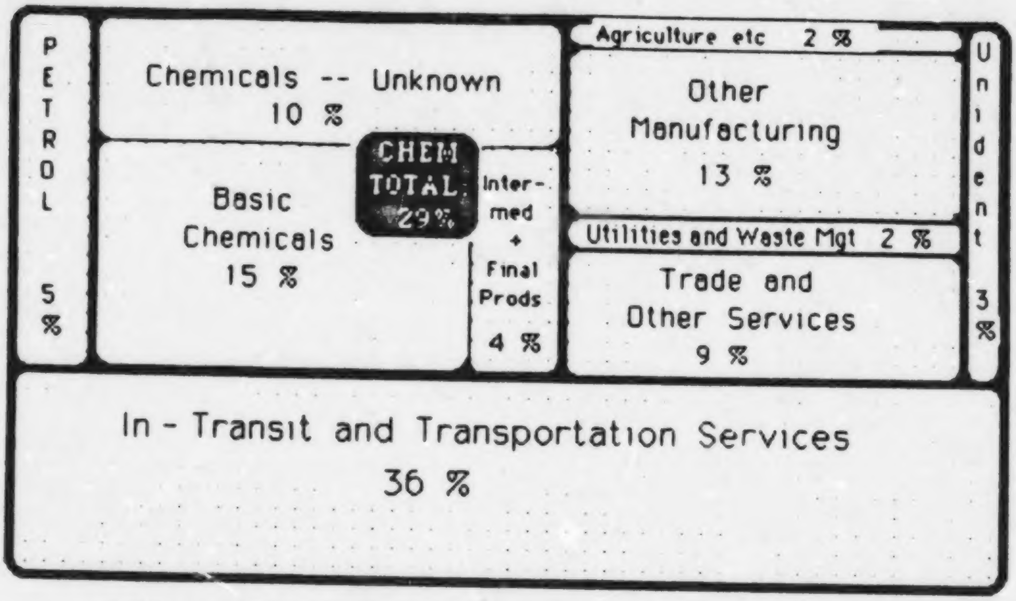
NUMBER OF EVENTS = 164

IEc/MTDS

Exhibit 23

Reported Number of Injuries

Distribution by Industry Sector

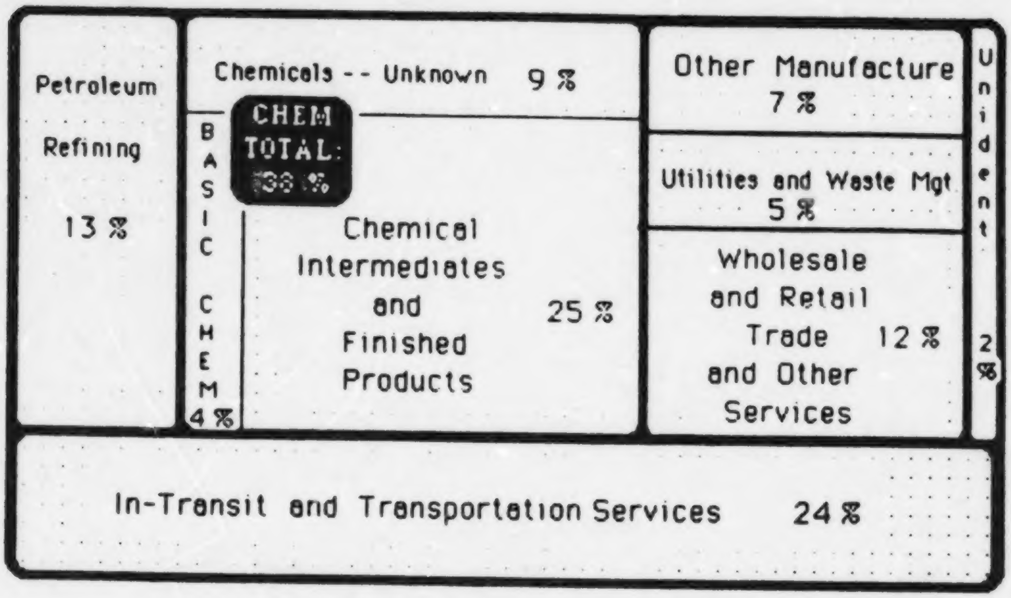


TOTAL INJURIES 4717 in five year period

Exhibit 24

Reported Number of Deaths

Distribution by Industry Sector

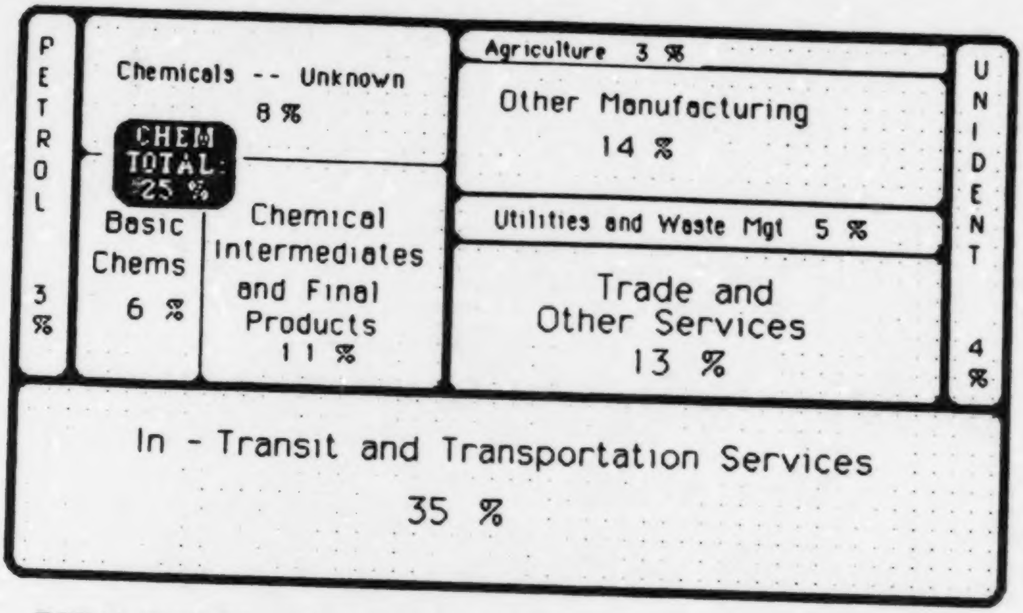


TOTAL DEATHS 138 in five year period

Exhibit 25

Number of Events With Reported Evacuations

Distribution by Industry Sector



TOTAL EVENTS WITH EVACUATIONS 155 in five year period

(NOTE. These events include only those with reported deaths or injuries. Other evacuation events are not included.)

Exhibit 26

END EFFECTS: DEATH OR INJURY EVENTS

FIXED FACILITIES -- BY INDUSTRY TYPE

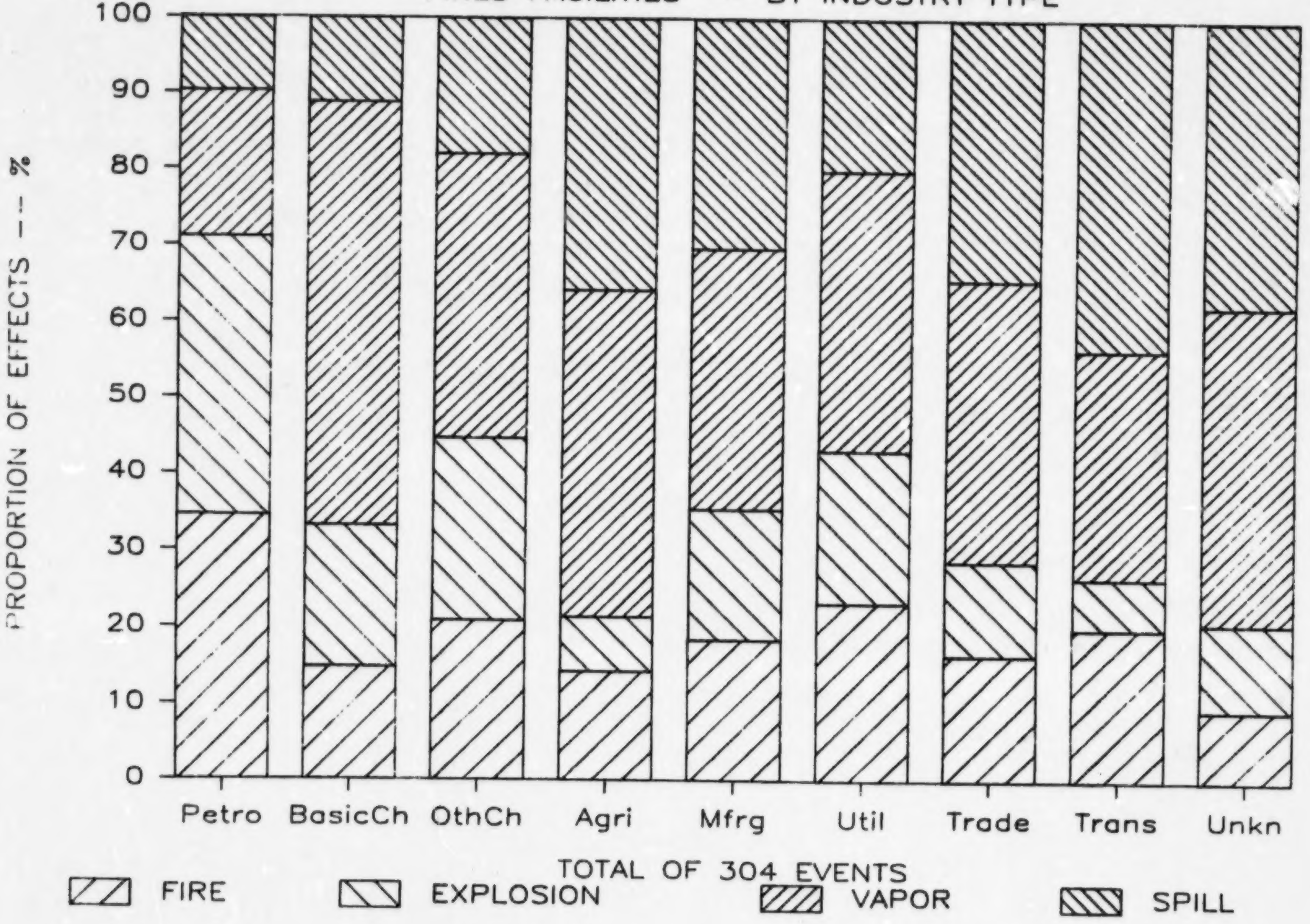


Exhibit 27

PROPERTY DAMAGE

From 64 Major Domestic Accidents

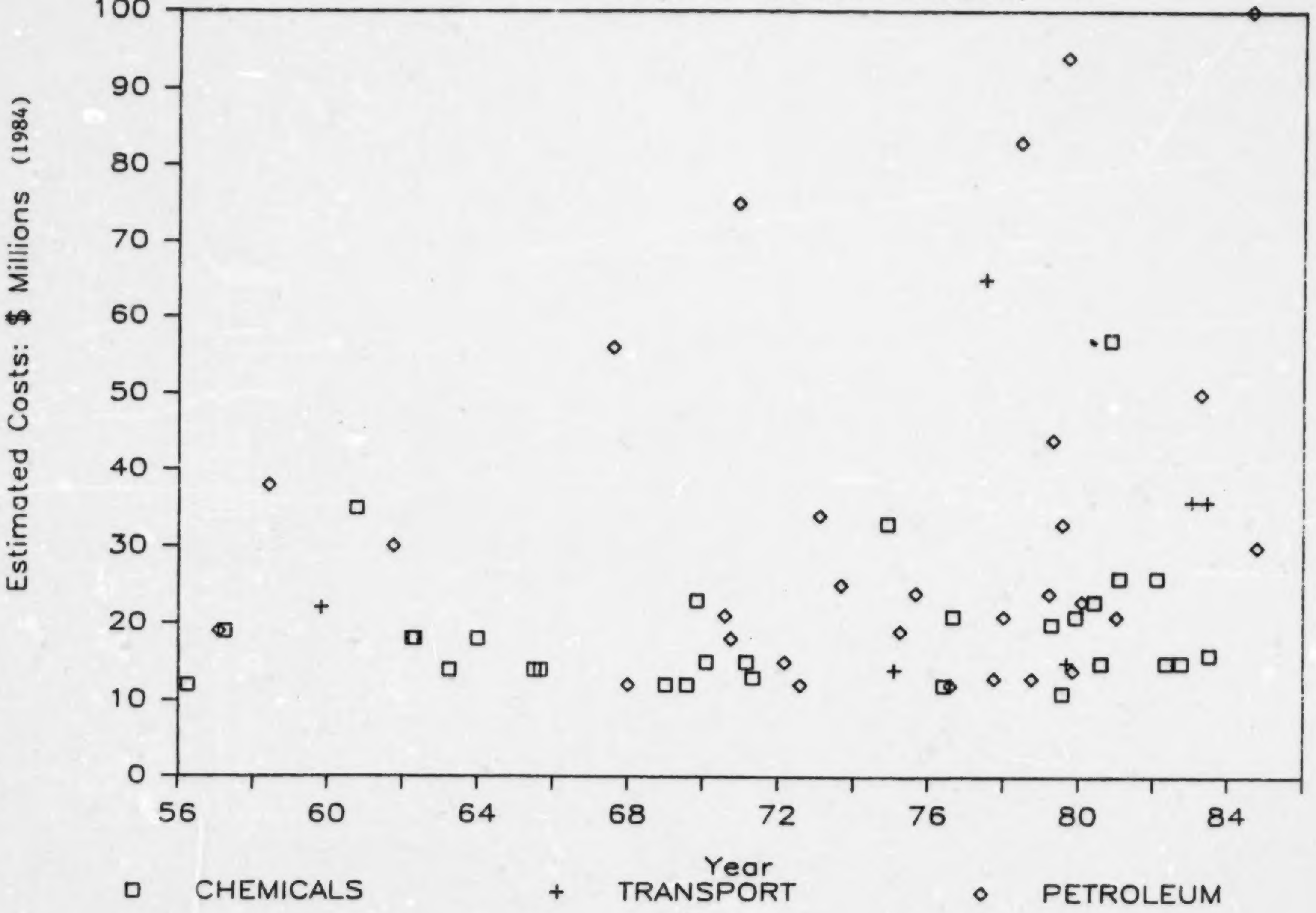
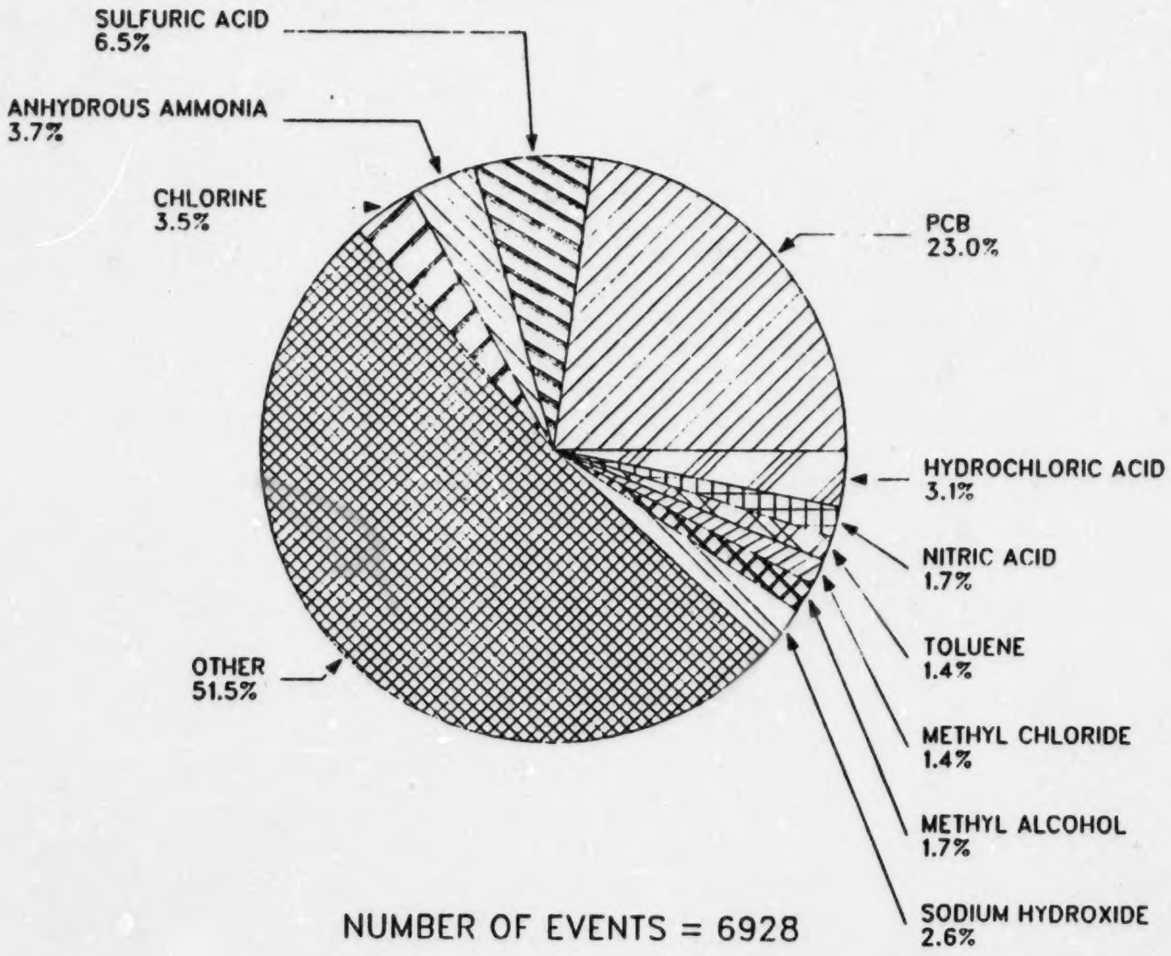


Exhibit 28

ACUTE HAZARDOUS EVENTS DATABASE
DISTRIBUTION OF EVENTS BY CHEMICAL FOR ALL EVENTS

10 CHEMICALS REPRESENTING THE LARGEST NUMBER OF EVENTS



NUMBER OF EVENTS = 6928

IEc/MTDS

Exhibit 29

DISTRIBUTION OF 770 NAMED SUBSTANCES

By SIC Group of Substance Released

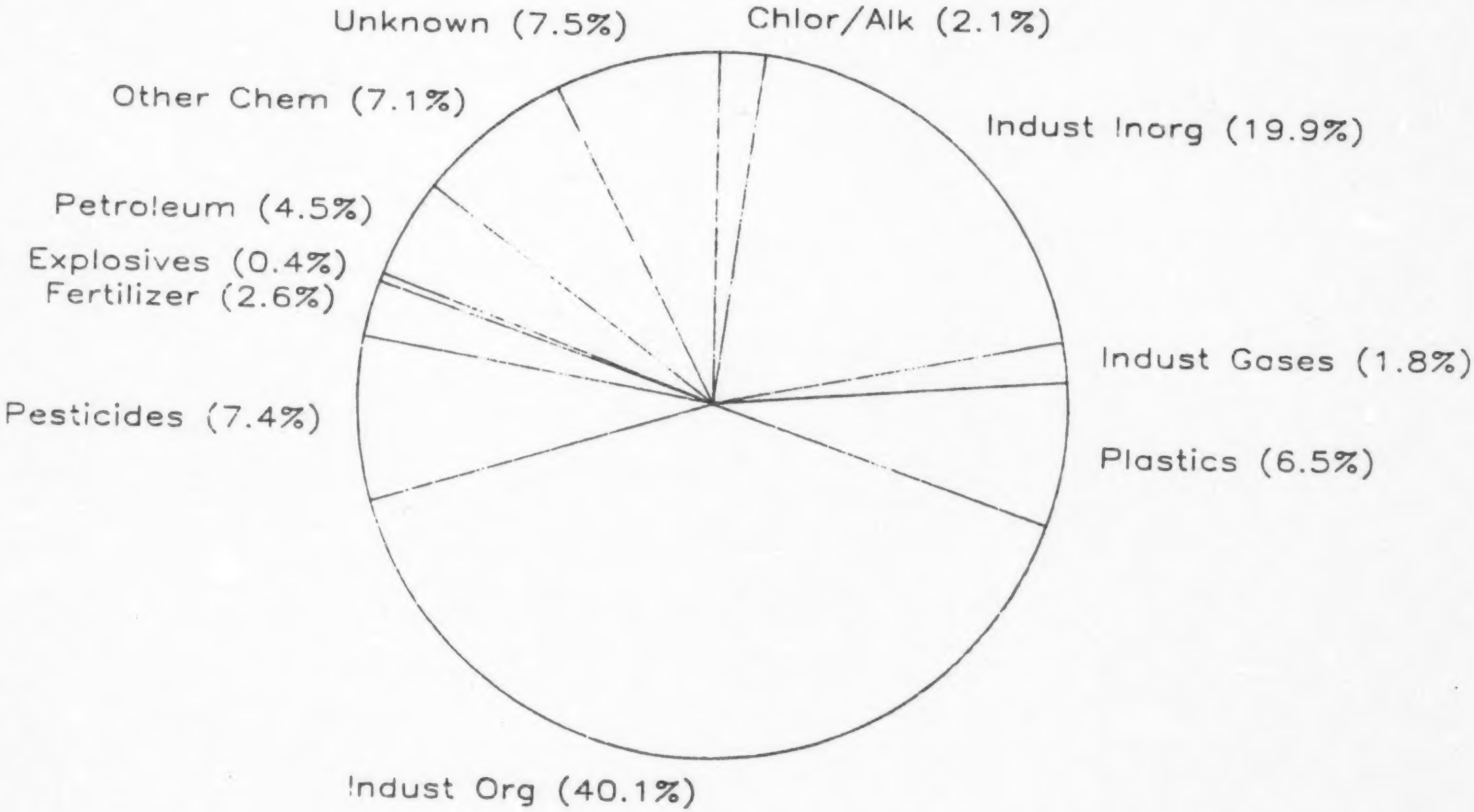


Exhibit 30

DISTRIBUTION OF TOTAL EVENTS

By SIC Group of Substance Released

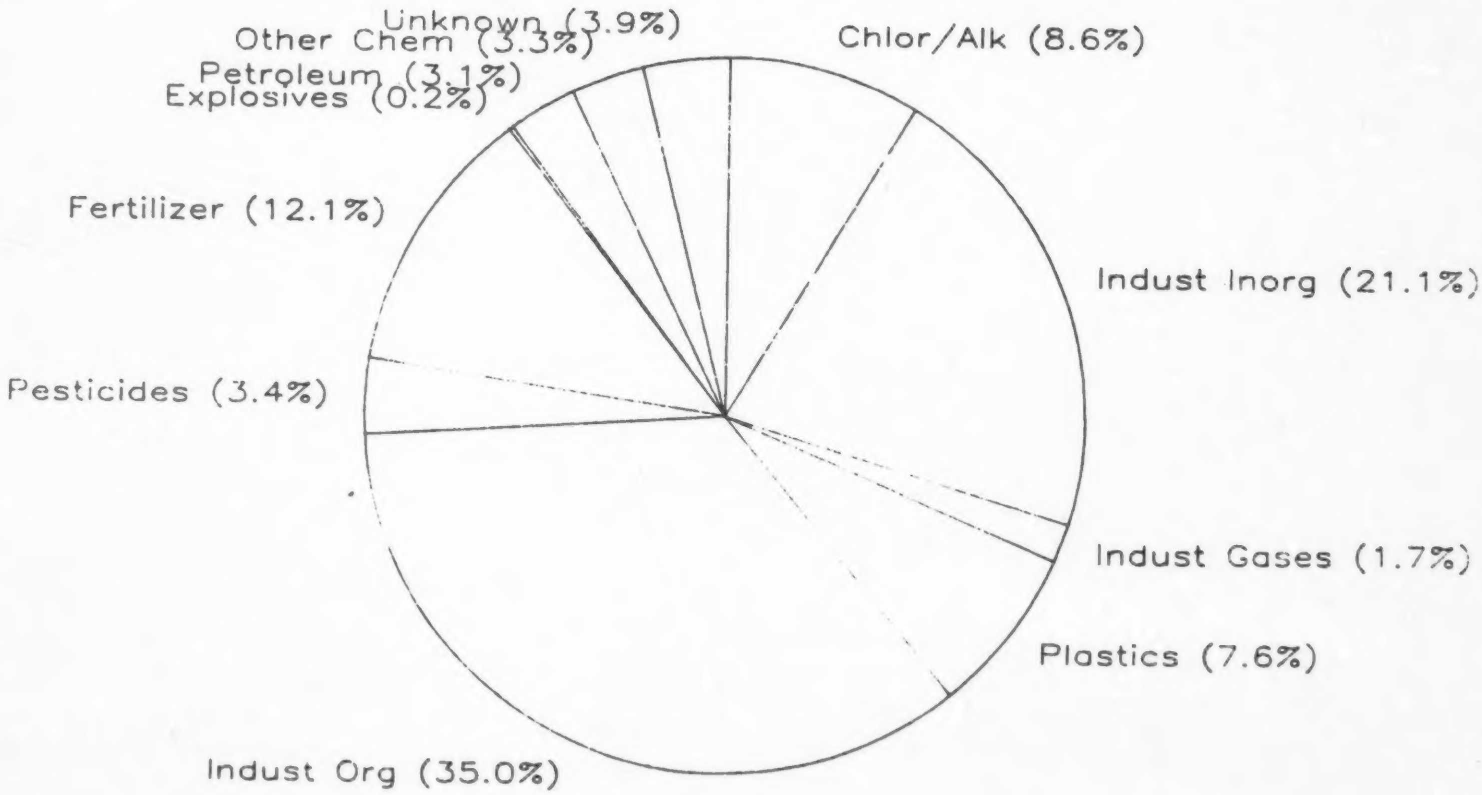


Exhibit 31

DISTRIBUTION OF QUANTITIES RELEASED

By SIC Group of Substance Released

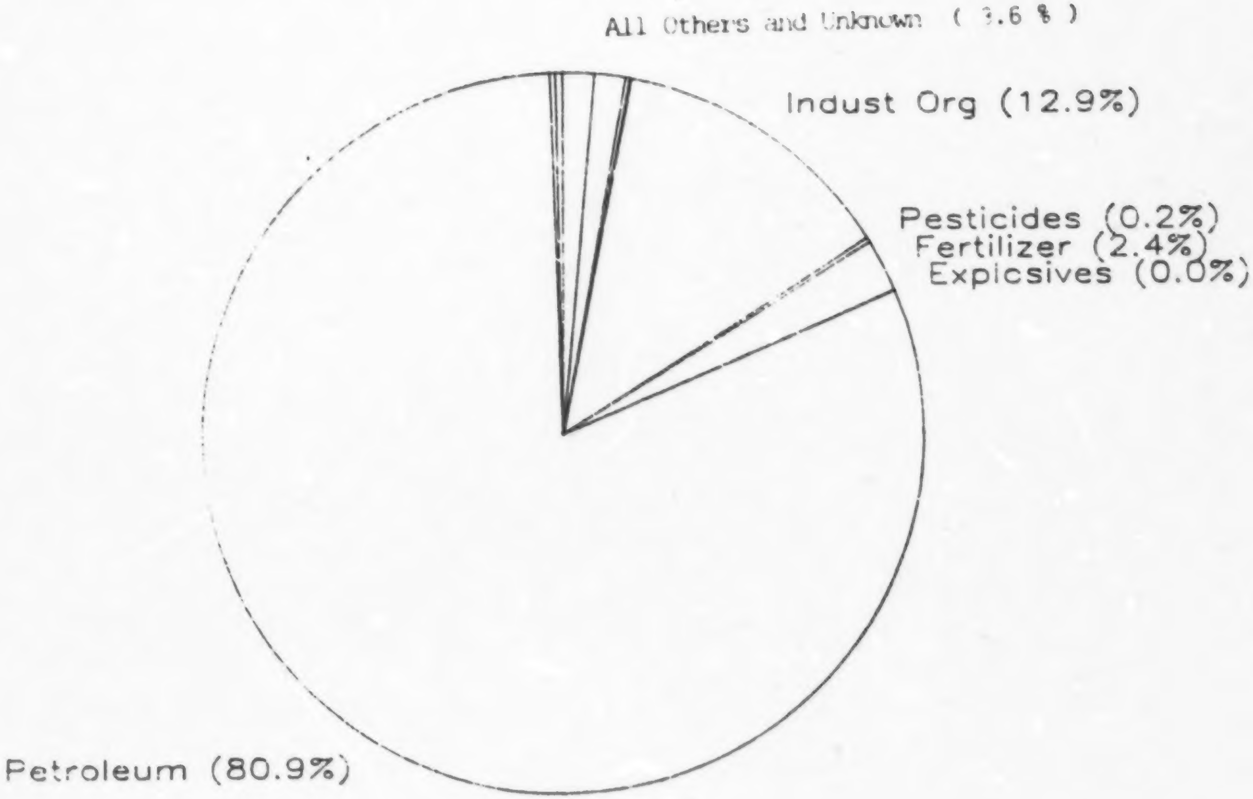


Exhibit 32

DISTRIBUTION OF EVENTS WITH INJURIES

By SIC Group of Substance Released

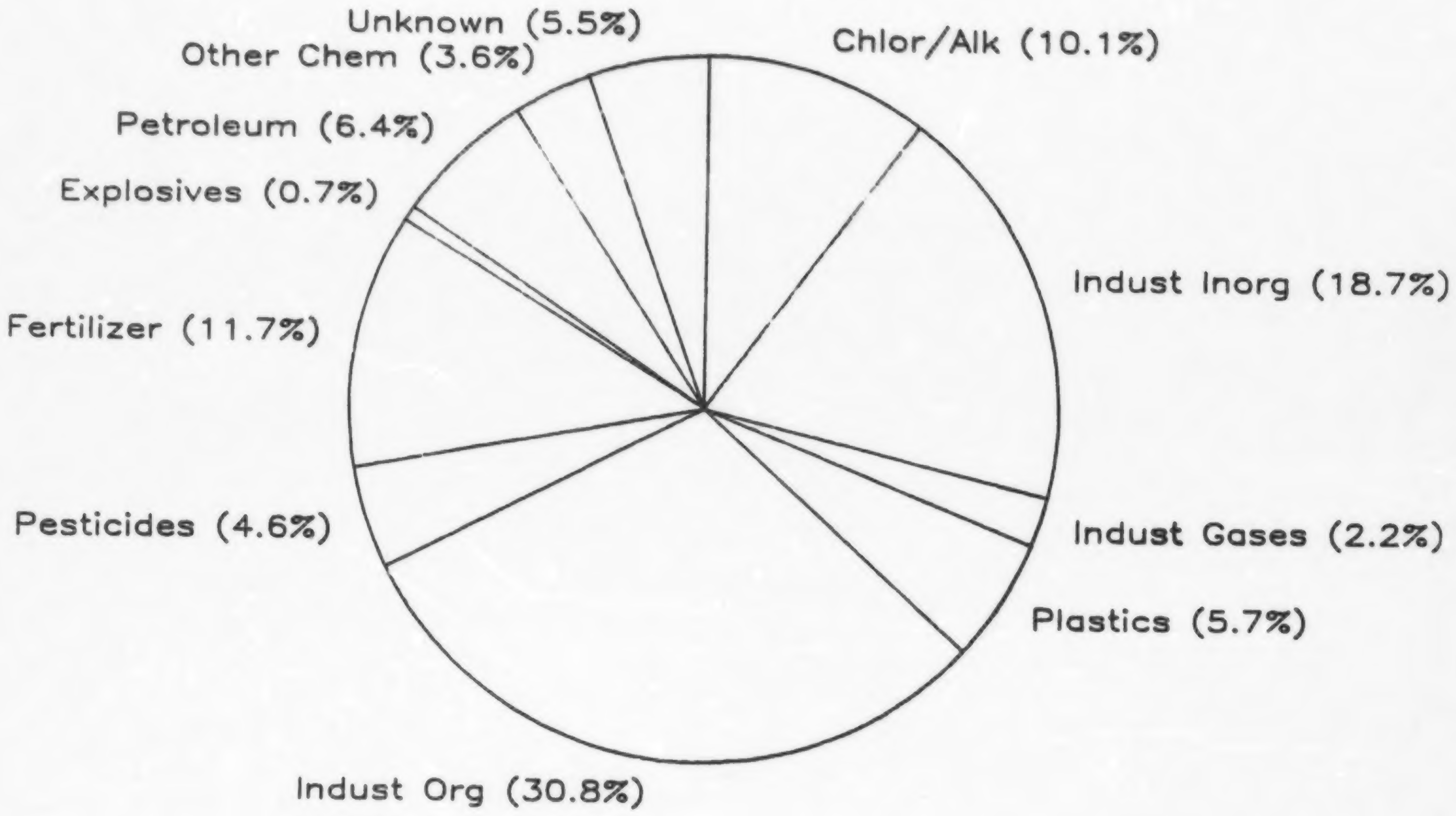


Exhibit 33

DISTRIBUTION OF NUMBER OF INJURIES

By SIC Group of Substance Released

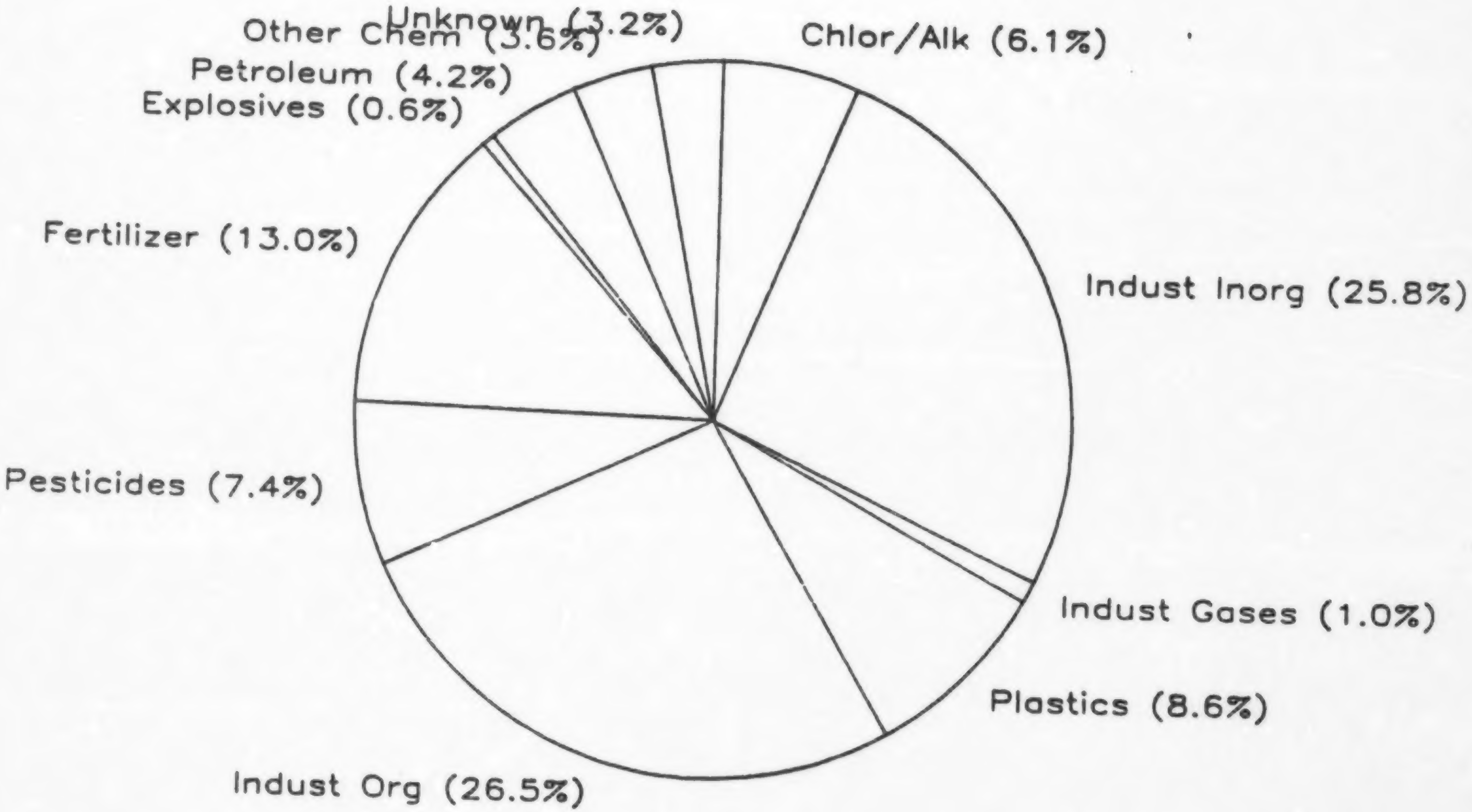


Exhibit 34

DISTRIBUTION OF EVENTS WITH FATALITIES

By SIC Group of Substance Released

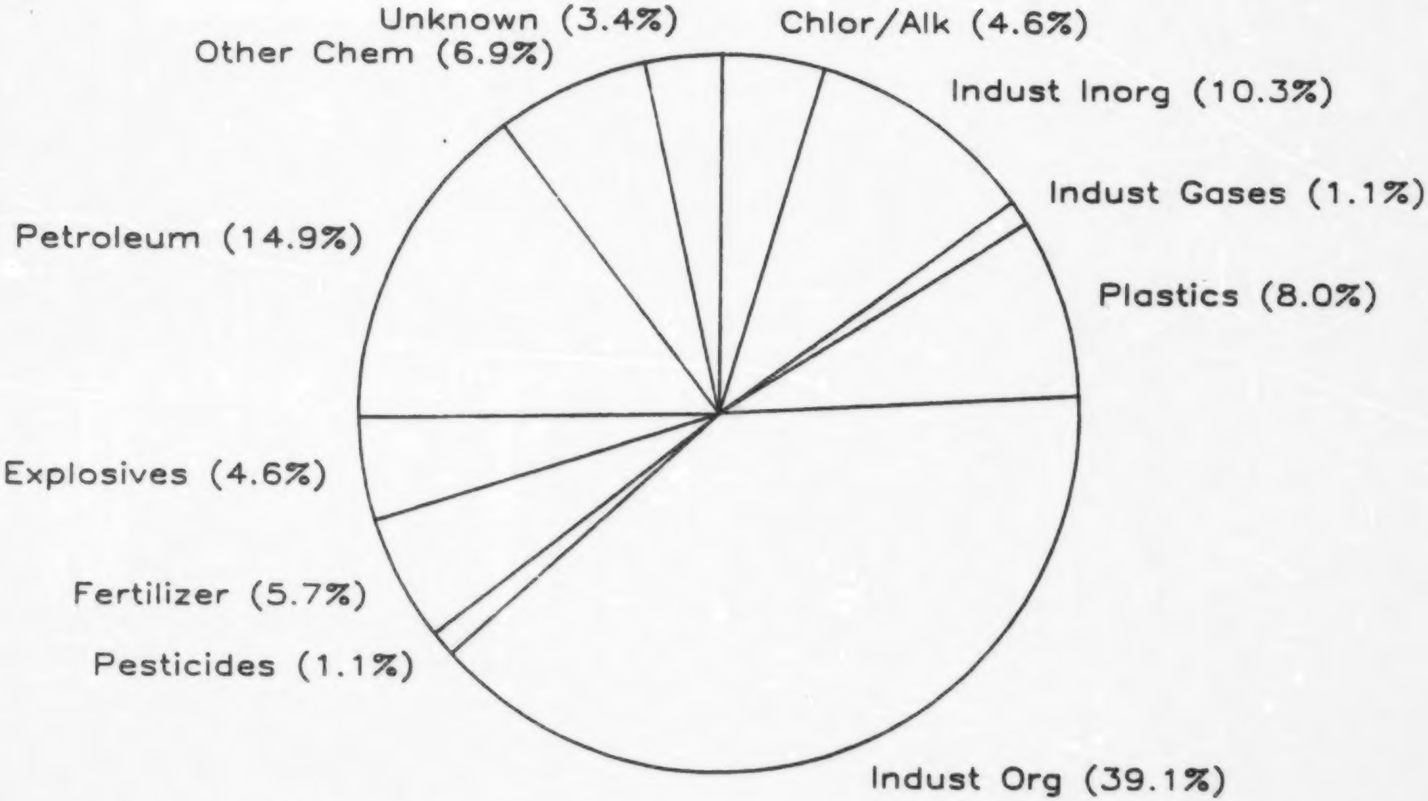
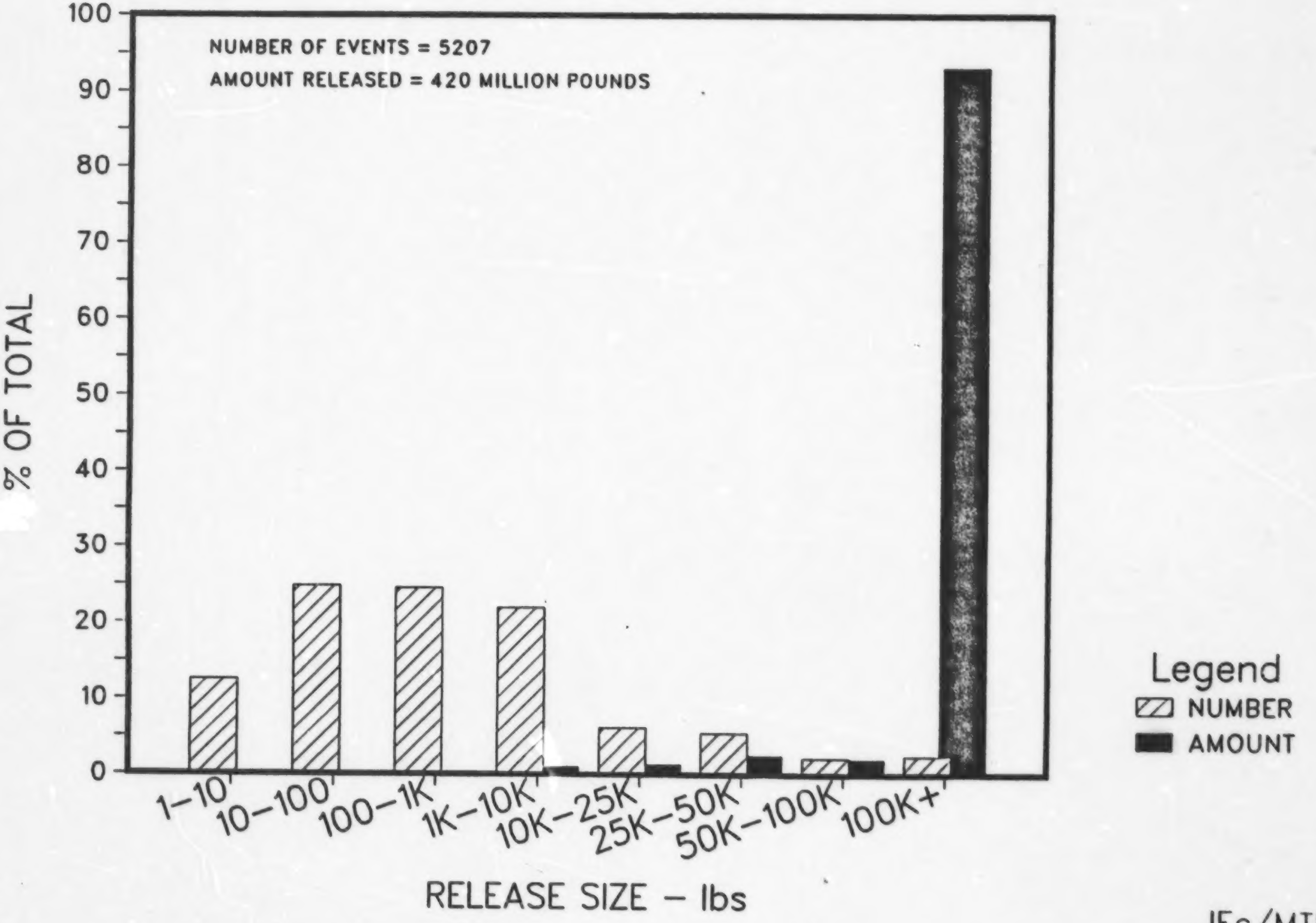


Exhibit 35

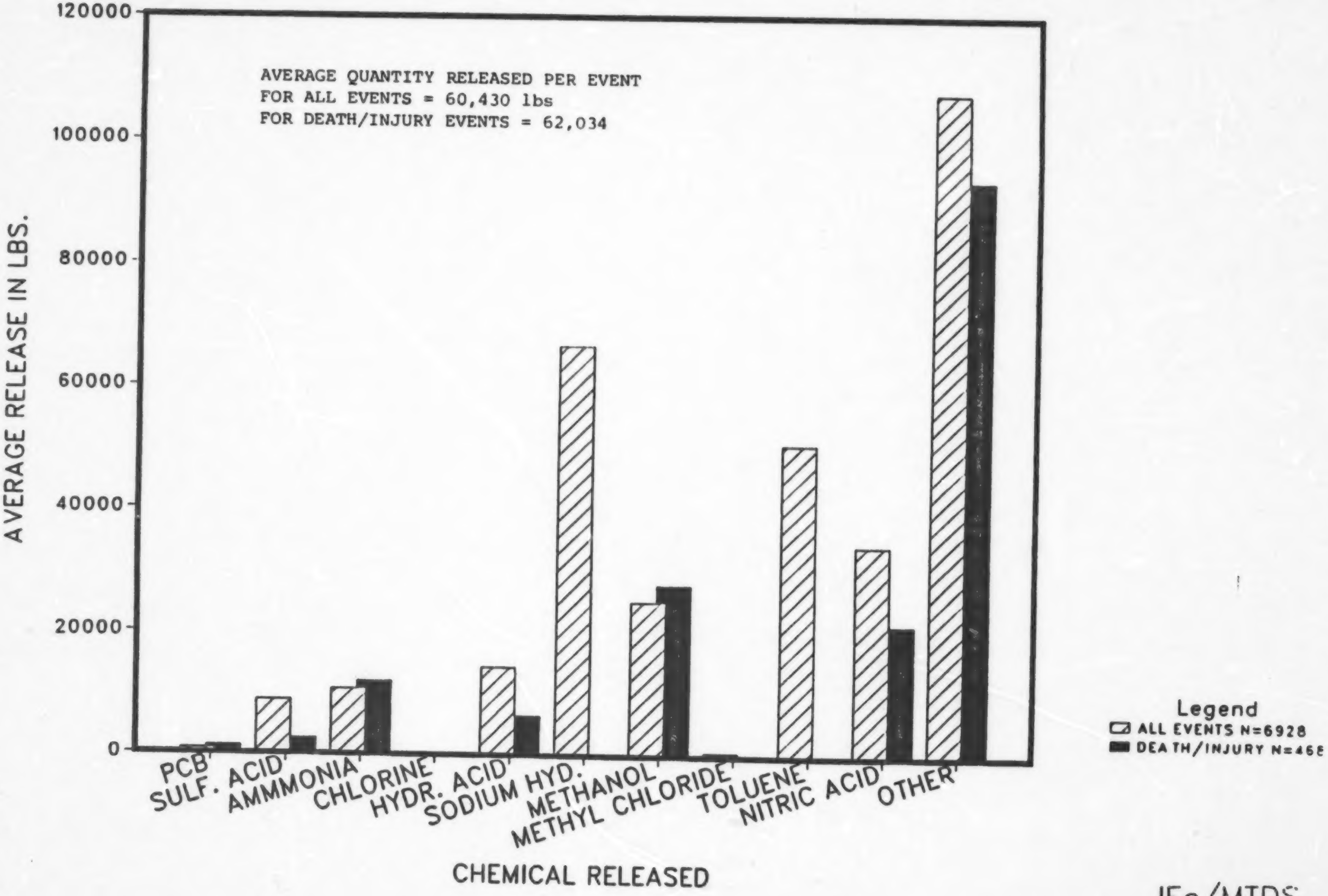
ACUTE HAZARDOUS EVENTS DATABASE FREQUENCY DISTRIBUTION BY RELEASE SIZE FOR ALL EVENTS



IEc/MTD

Exhibit 36

ACUTE HAZARDOUS EVENTS DATABASE
AVERAGE QUANTITY RELEASED PER EVENT

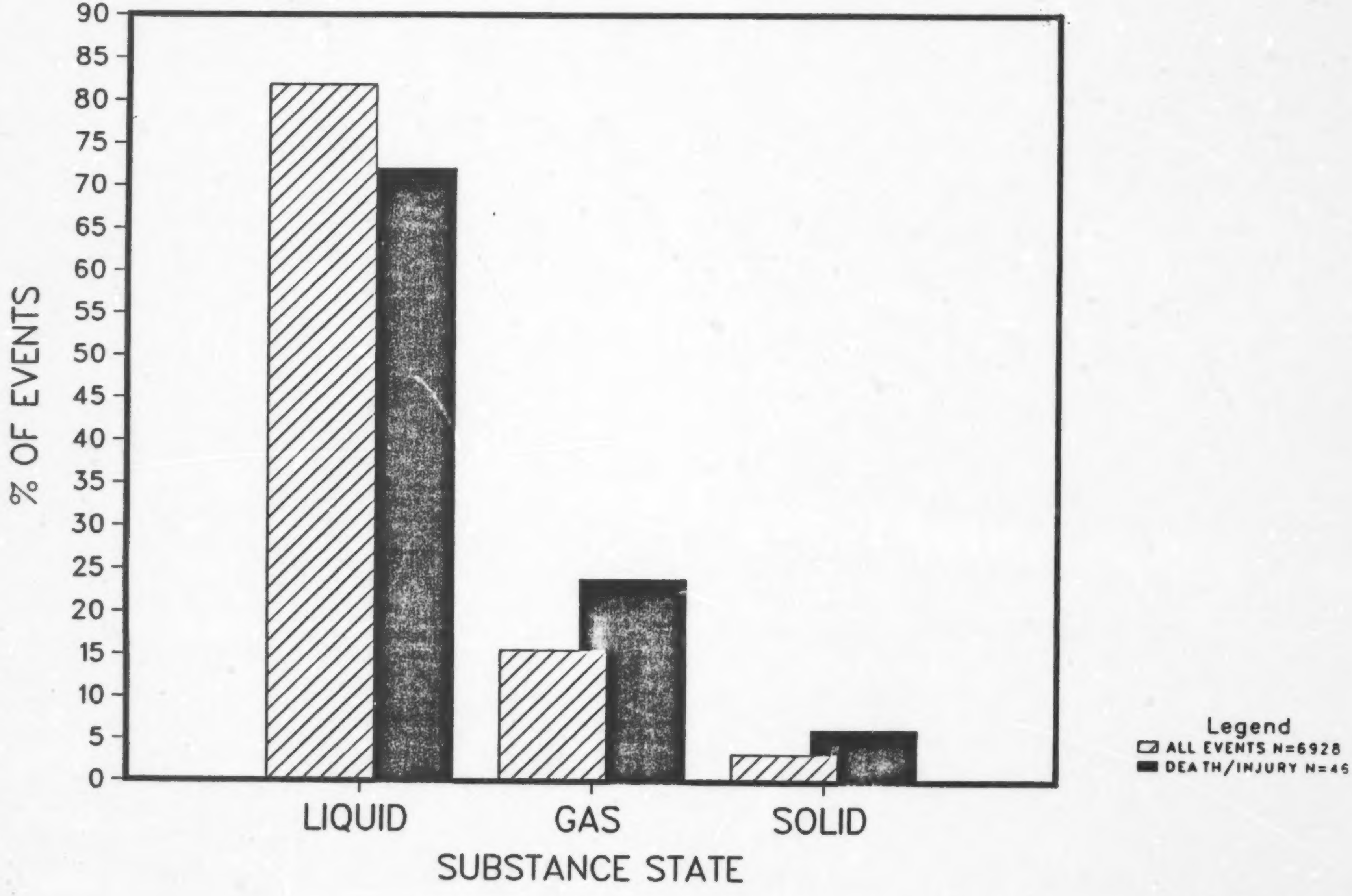


AVERAGE QUANTITY RELEASED PER EVENT
FOR ALL EVENTS = 60,430 lbs
FOR DEATH/INJURY EVENTS = 62,034

IEc/MTDS

Exhibit 37

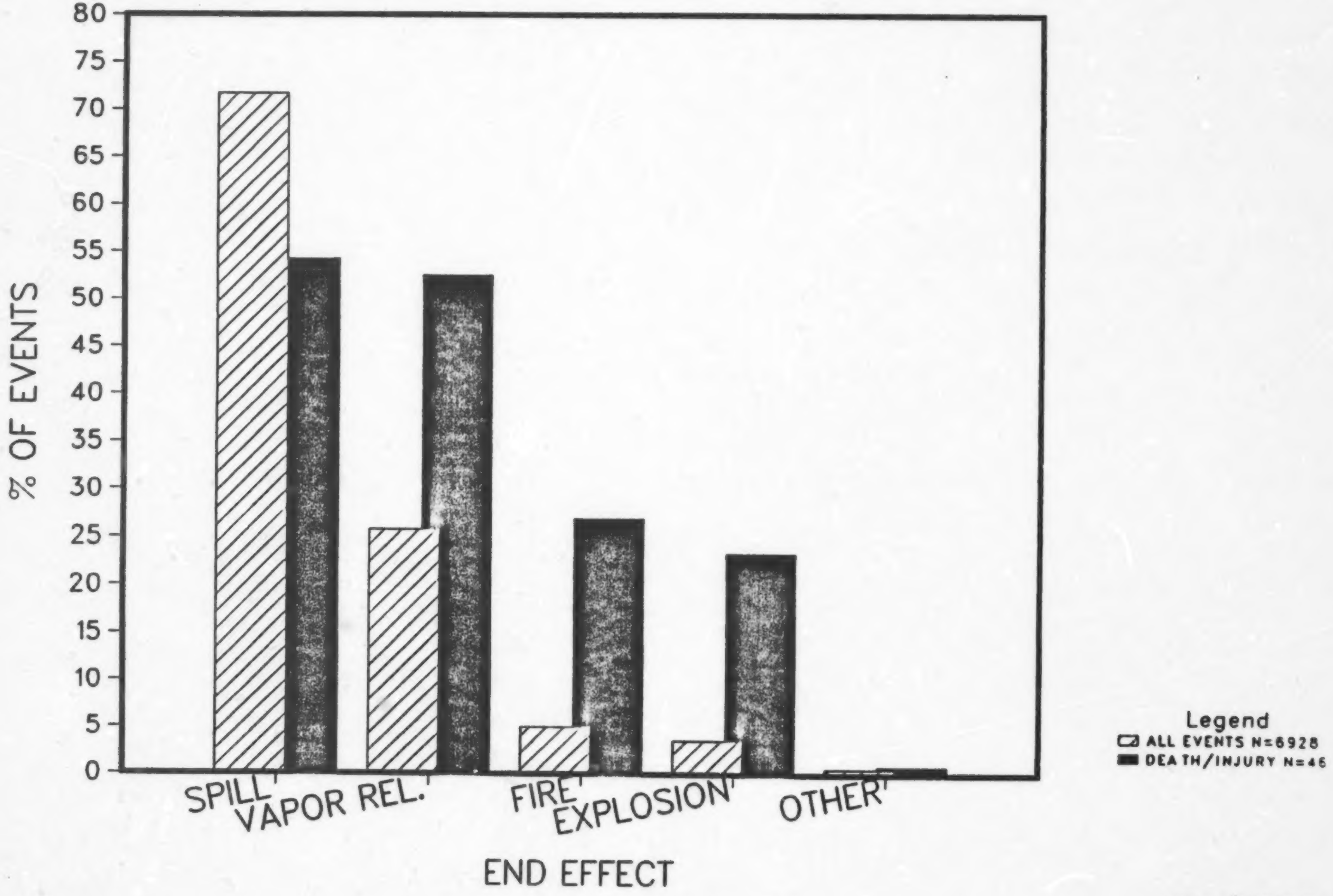
ACUTE HAZARDOUS EVENTS DATABASE
STATE OF SUBSTANCES RELEASED



IEc/MTDS

Exhibit 38

ACUTE HAZARDOUS EVENTS DATABASE FREQUENCY OF REPORTED END EFFECTS



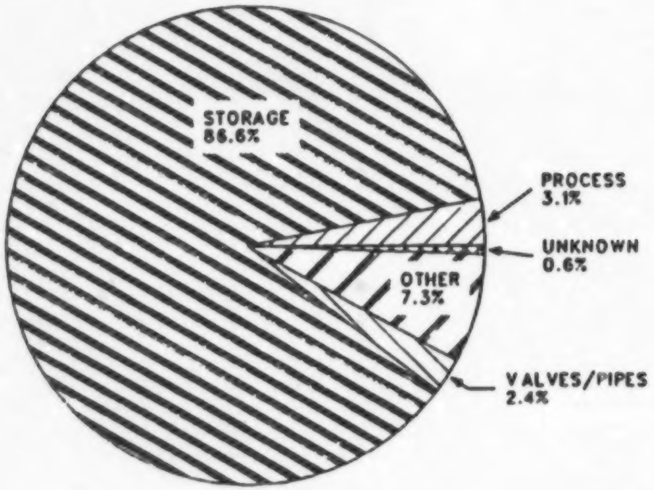
IEc/MIDS

Exhibit 39

ACUTE HAZARDOUS EVENTS DATABASE

IN–PLANT EVENTS BY LOCATION

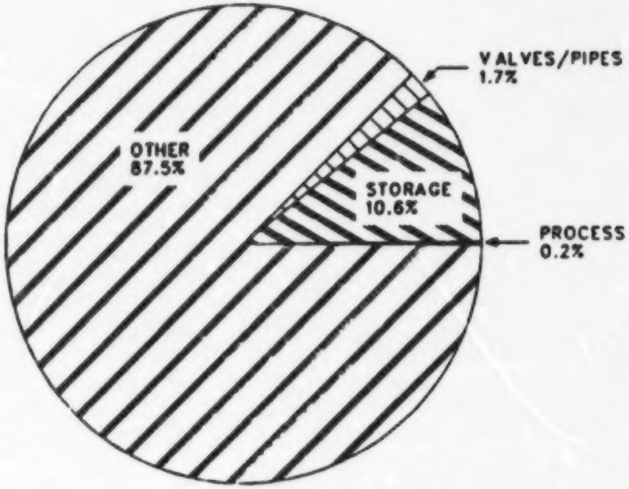
TOTAL AMOUNT RELEASED



NUMBER OF EVENTS = 5179

IN–PLANT EVENTS BY LOCATION

AMOUNT RELEASED IN DEATH/INJURY EVENTS



NUMBER OF EVENTS = 304

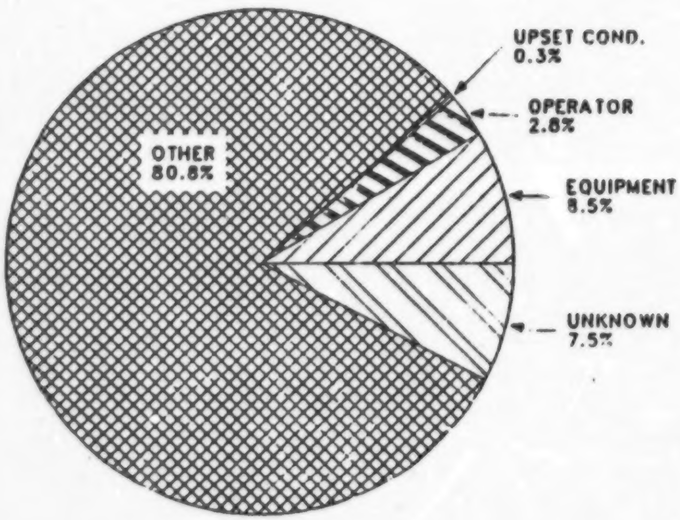
IEc/MTD

Exhibit 40

ACUTE HAZARDOUS EVENTS DATABASE

IN–PLANT EVENTS BY CAUSE

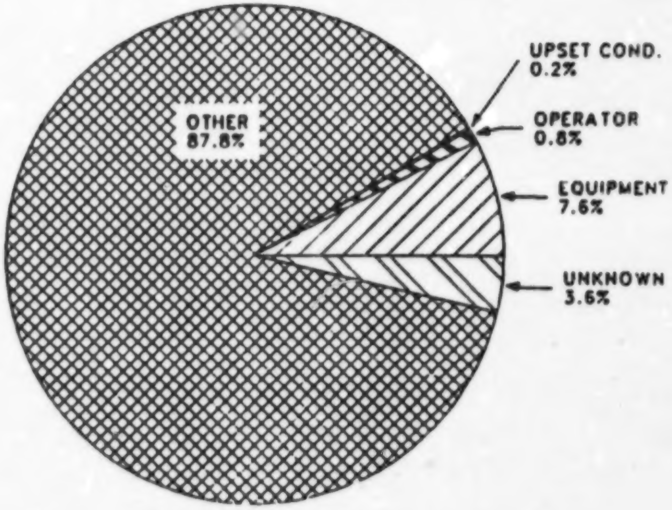
TOTAL AMOUNT RELEASED



NUMBER OF EVENTS = 5179

IN–PLANT EVENTS BY CAUSE

AMOUNT RELEASED IN DEATH/INJURY EVENTS

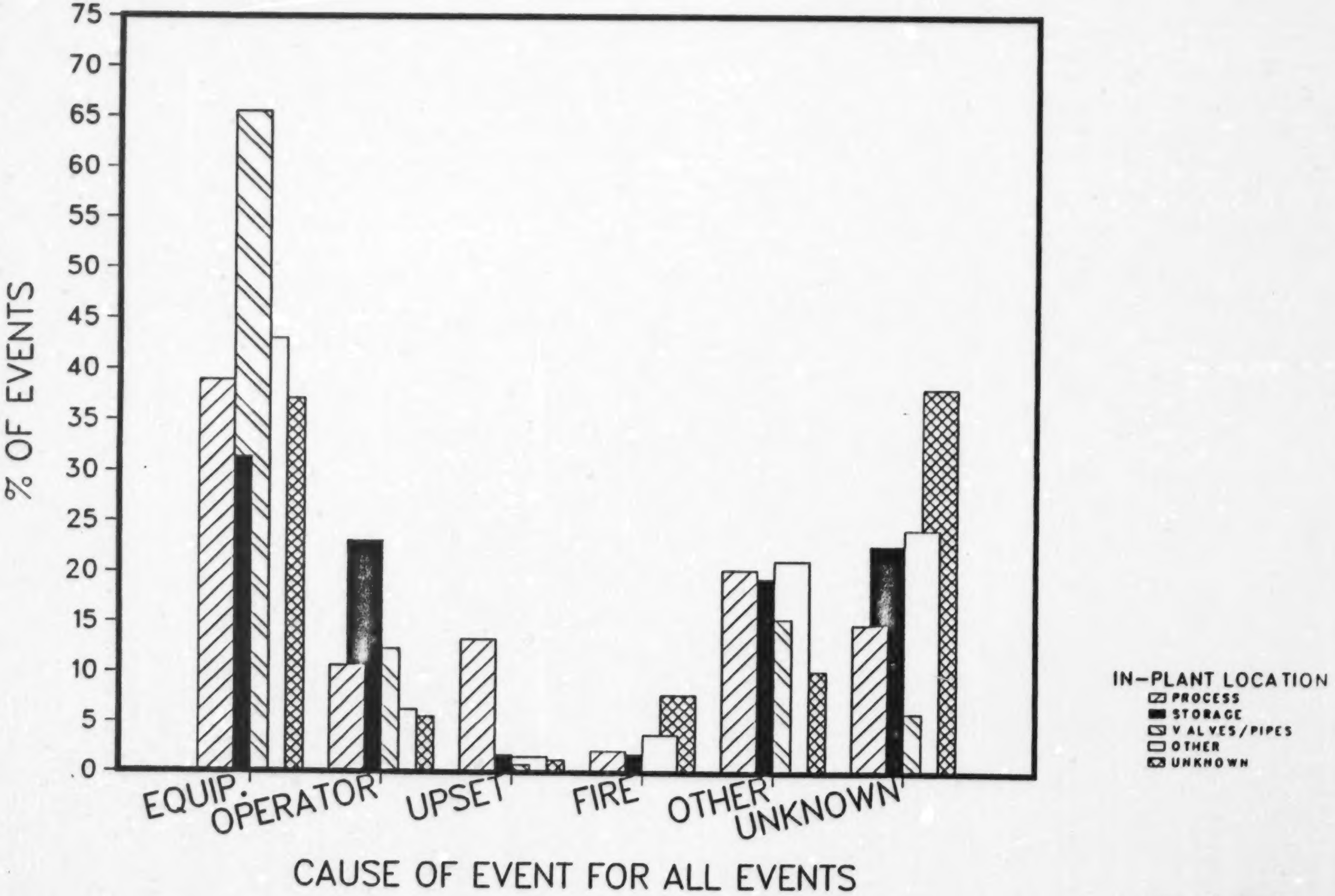


NUMBER OF EVENTS = 304

IEc/MTD

Exhibit 41

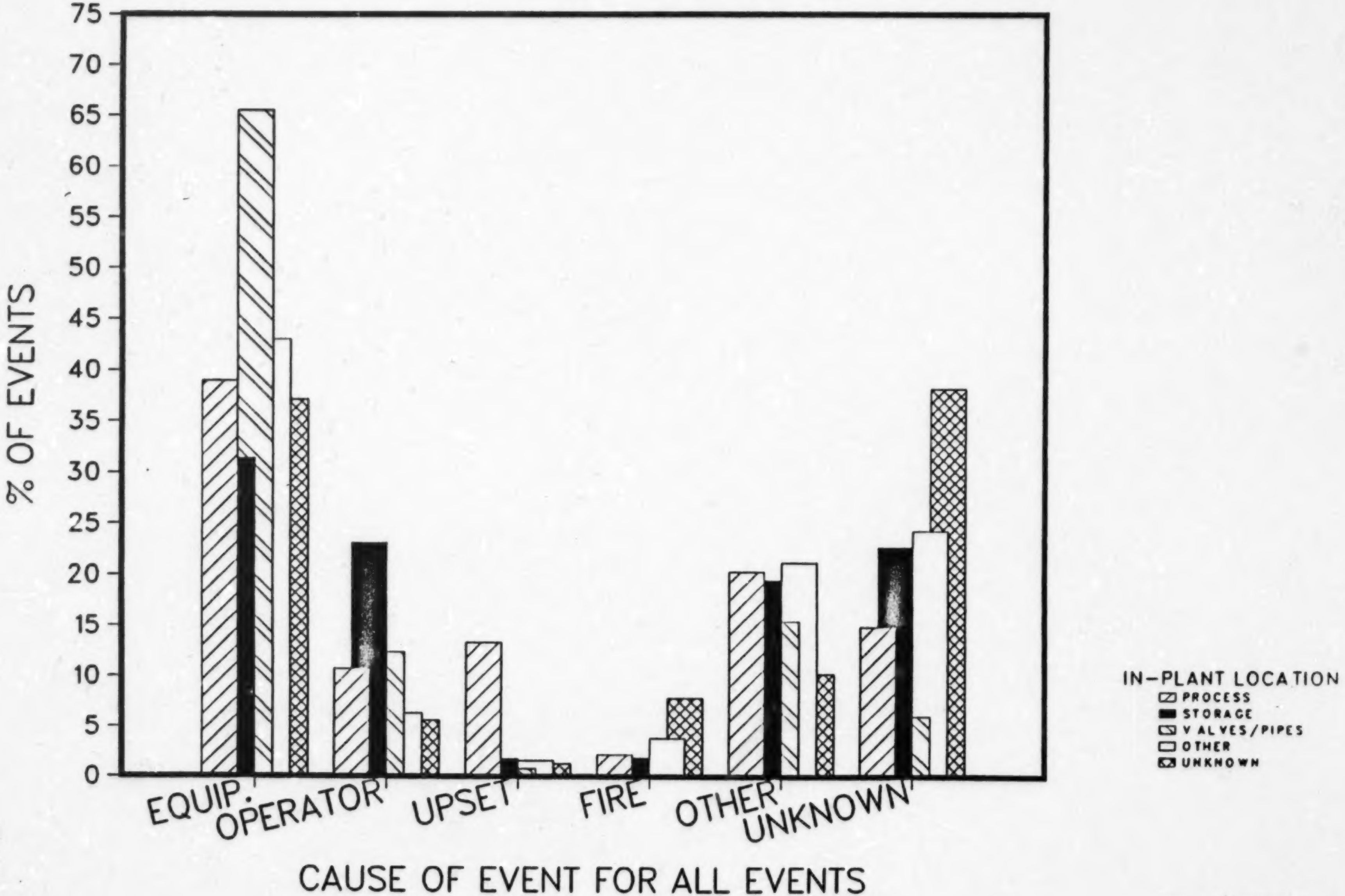
ACUTE HAZARDOUS EVENTS DATABASE
IN-PLANT EVENTS BY CAUSE AND LOCATION



IEc/MTDS

Exhibit 41

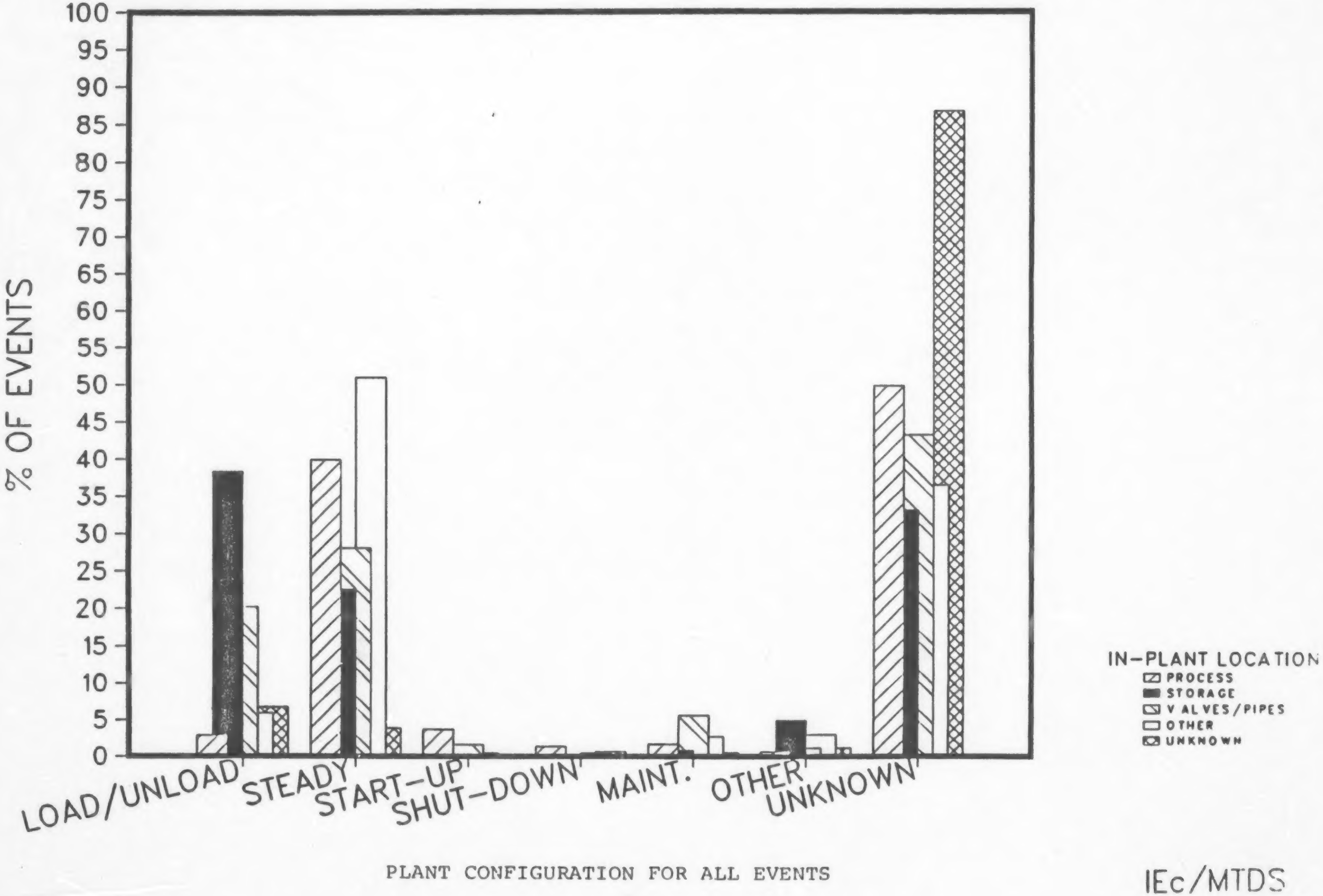
ACUTE HAZARDOUS EVENTS DATABASE
IN-PLANT EVENTS BY CAUSE AND LOCATION



IEc/MTDS

Exhibit 42

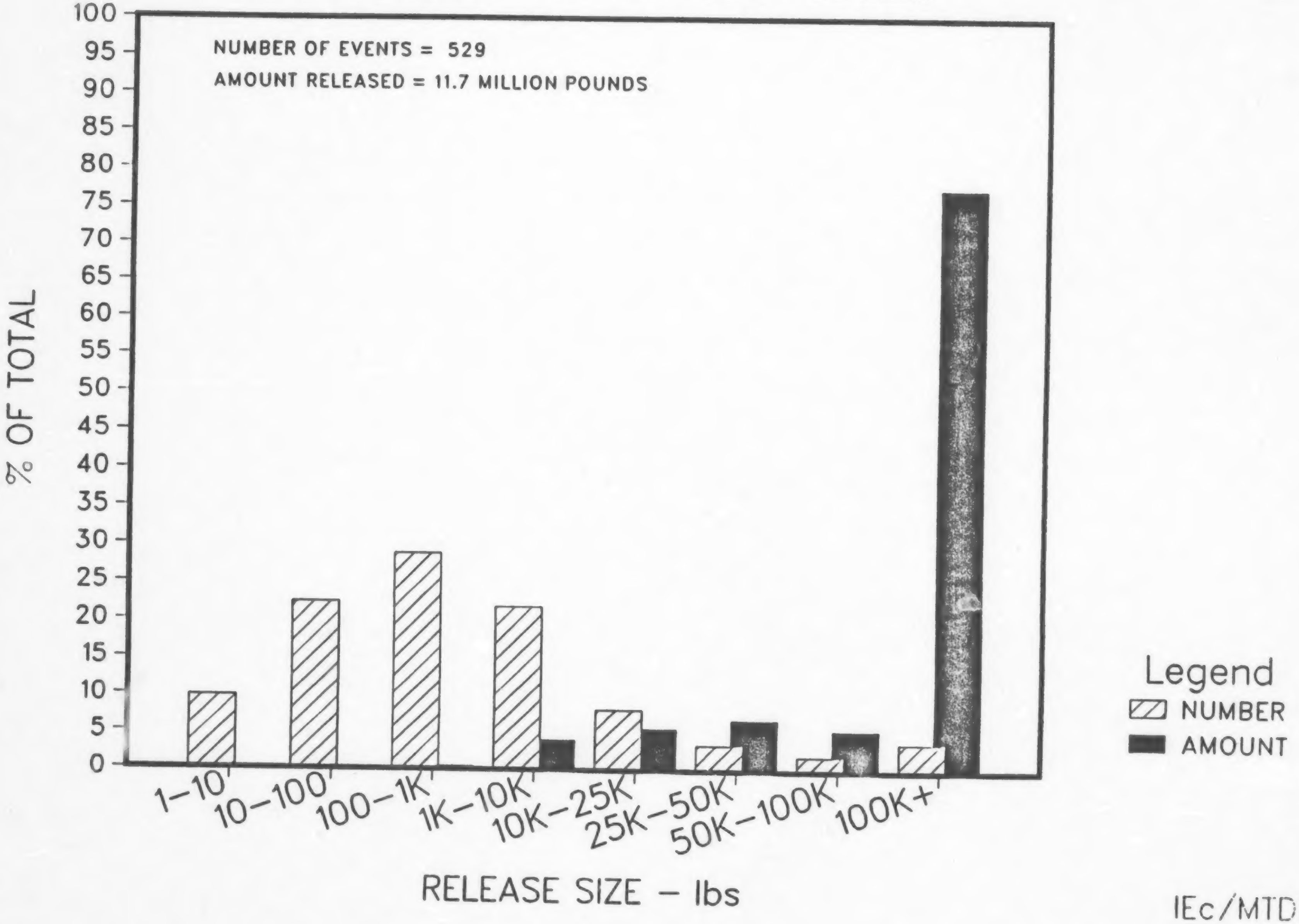
ACUTE HAZARDOUS EVENTS DATABASE
IN-PLANT EVENTS BY CONFIGURATION AND LOCATION



IEc/MTDS

Exhibit 43

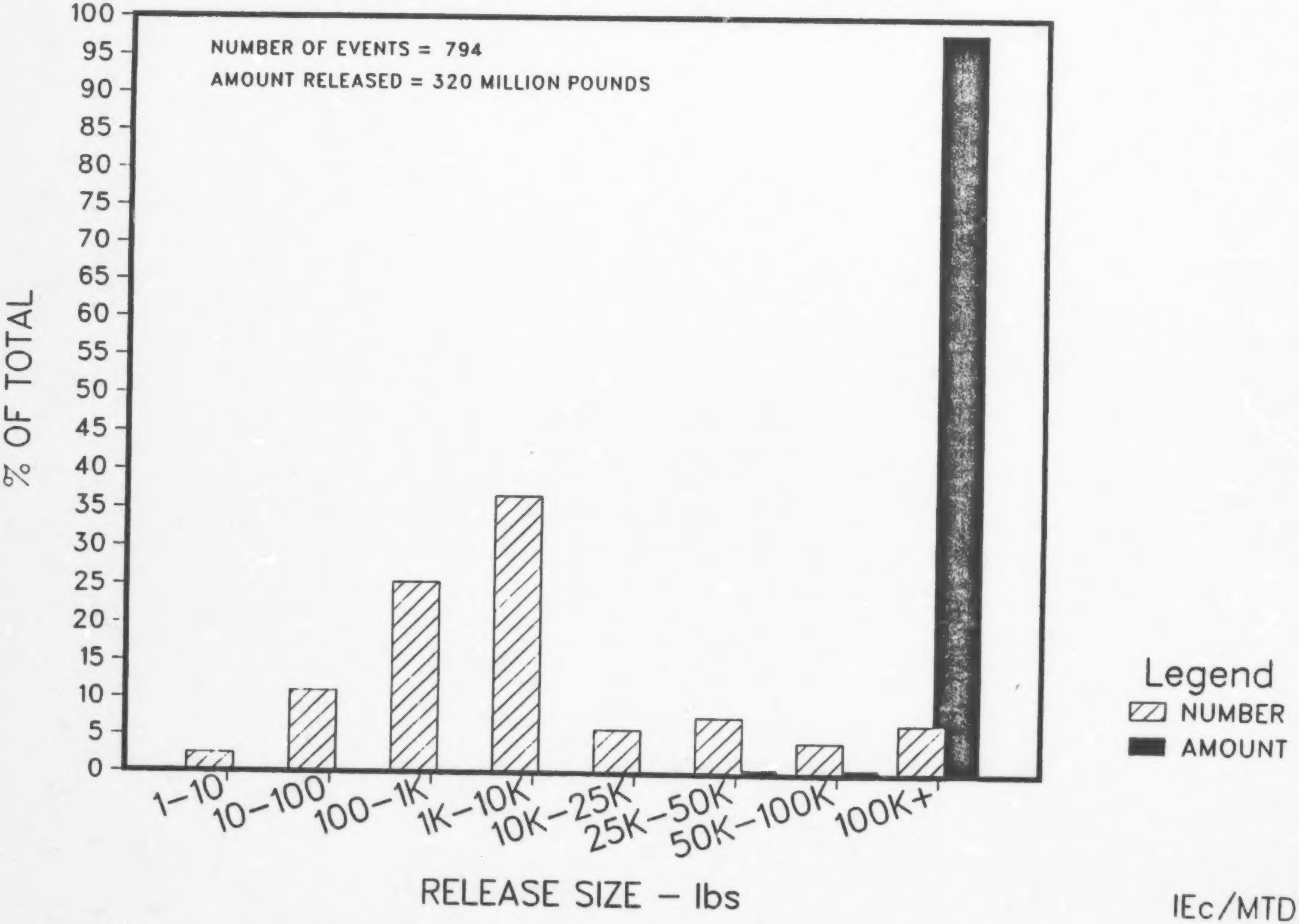
ACUTE HAZARDOUS EVENTS DATABASE
DISTRIBUTION BY RELEASE SIZE FOR IN-PLANT LOCATIONS
EVENTS INVOLVING PROCESS VESSELS



IEc/MTDS

Exhibit 44

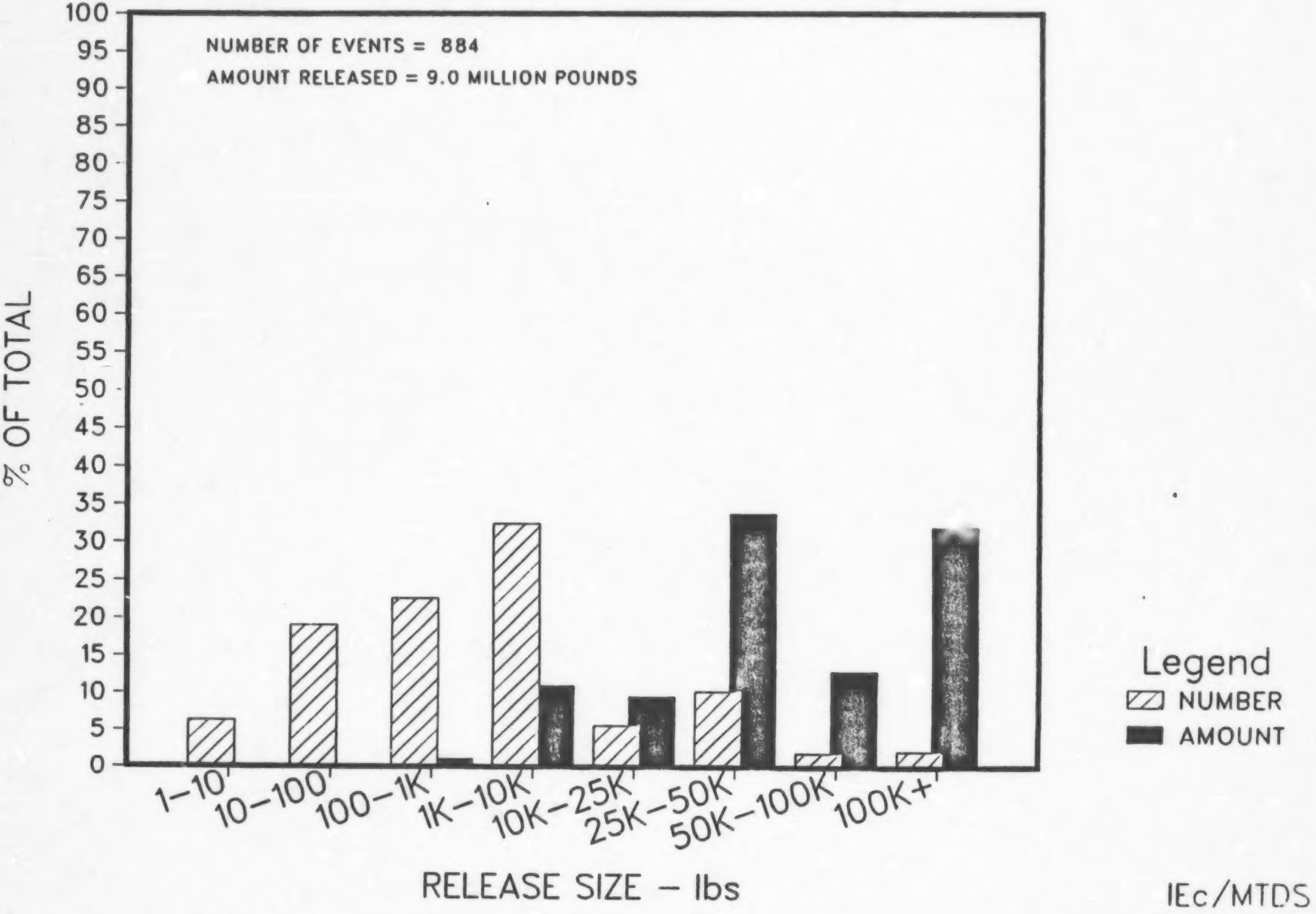
ACUTE HAZARDOUS EVENTS DATABASE
DISTRIBUTION BY RELEASE SIZE FOR IN-PLANT LOCATIONS
EVENTS INVOLVING STORAGE VESSELS



IEc/MTDS

Exhibit 45

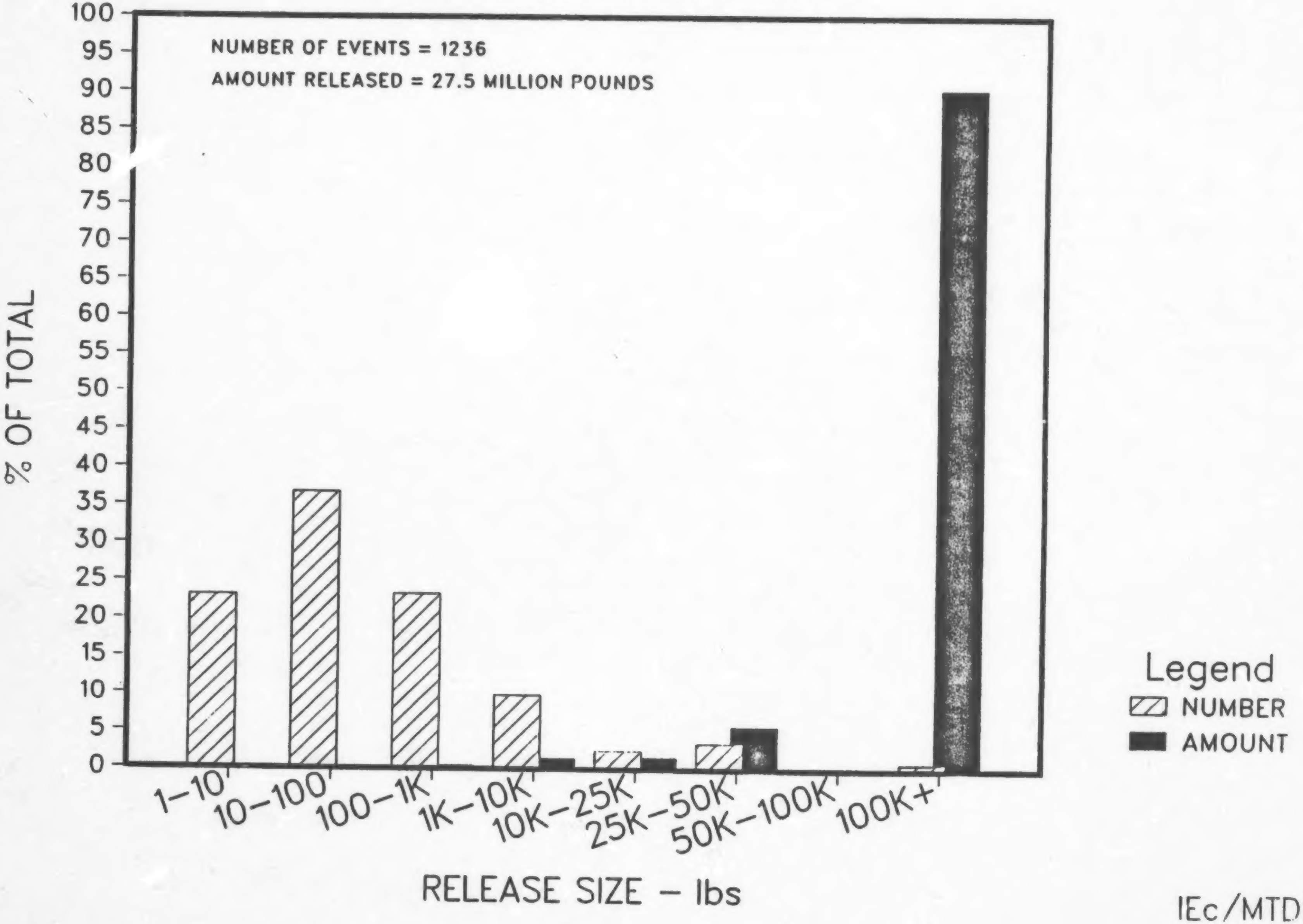
ACUTE HAZARDOUS EVENTS DATABASE DISTRIBUTION BY RELEASE SIZE FOR IN-PLANT LOCATIONS EVENTS INVOLVING VALVES/PIPES



IEc/MTDS

Exhibit 46

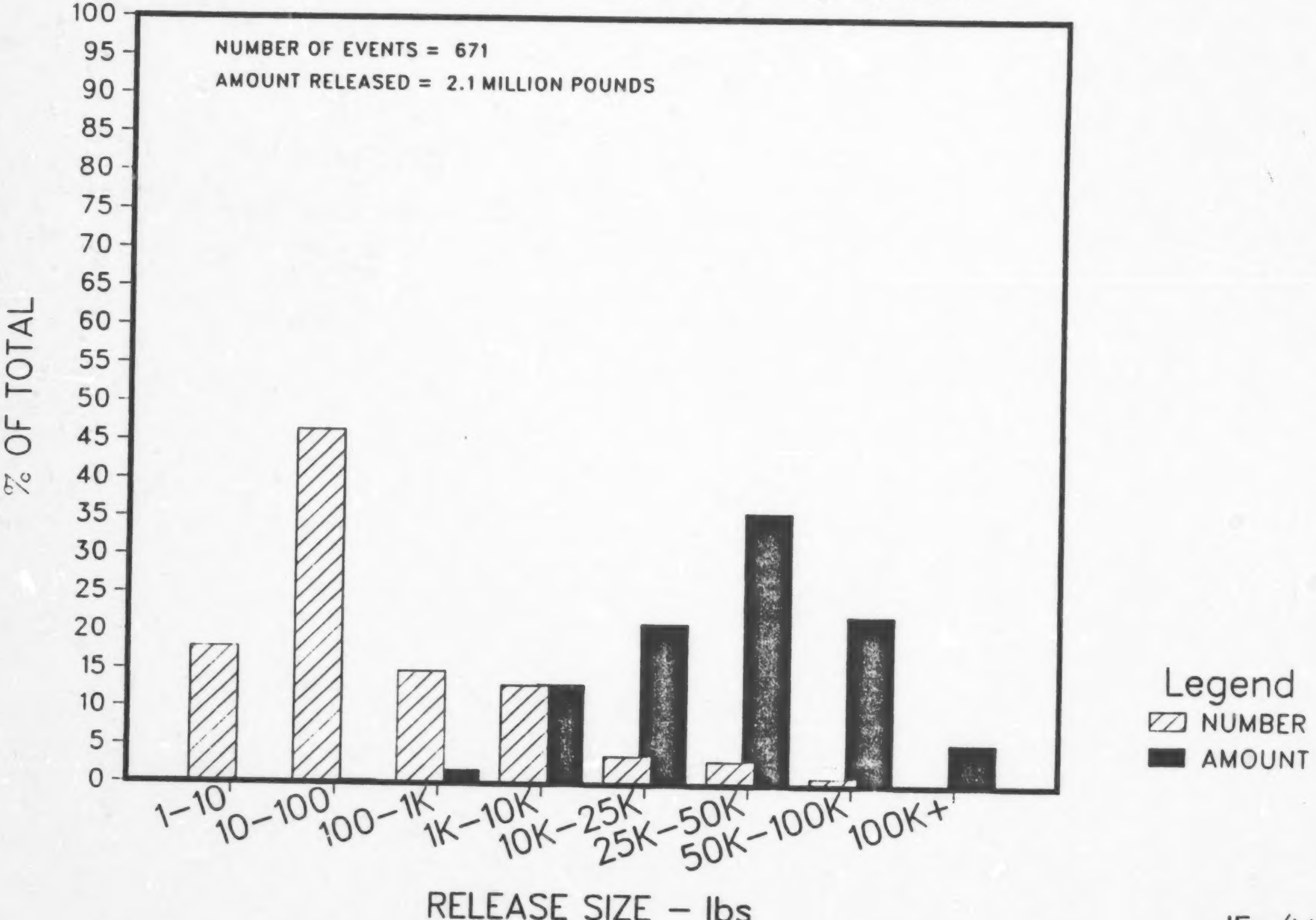
ACUTE HAZARDOUS EVENTS DATABASE
DISTRIBUTION BY RELEASE SIZE FOR IN-PLANT LOCATIONS INVOLVING OTHER LOCATIONS



IEc/MTDS

Exhibit 47

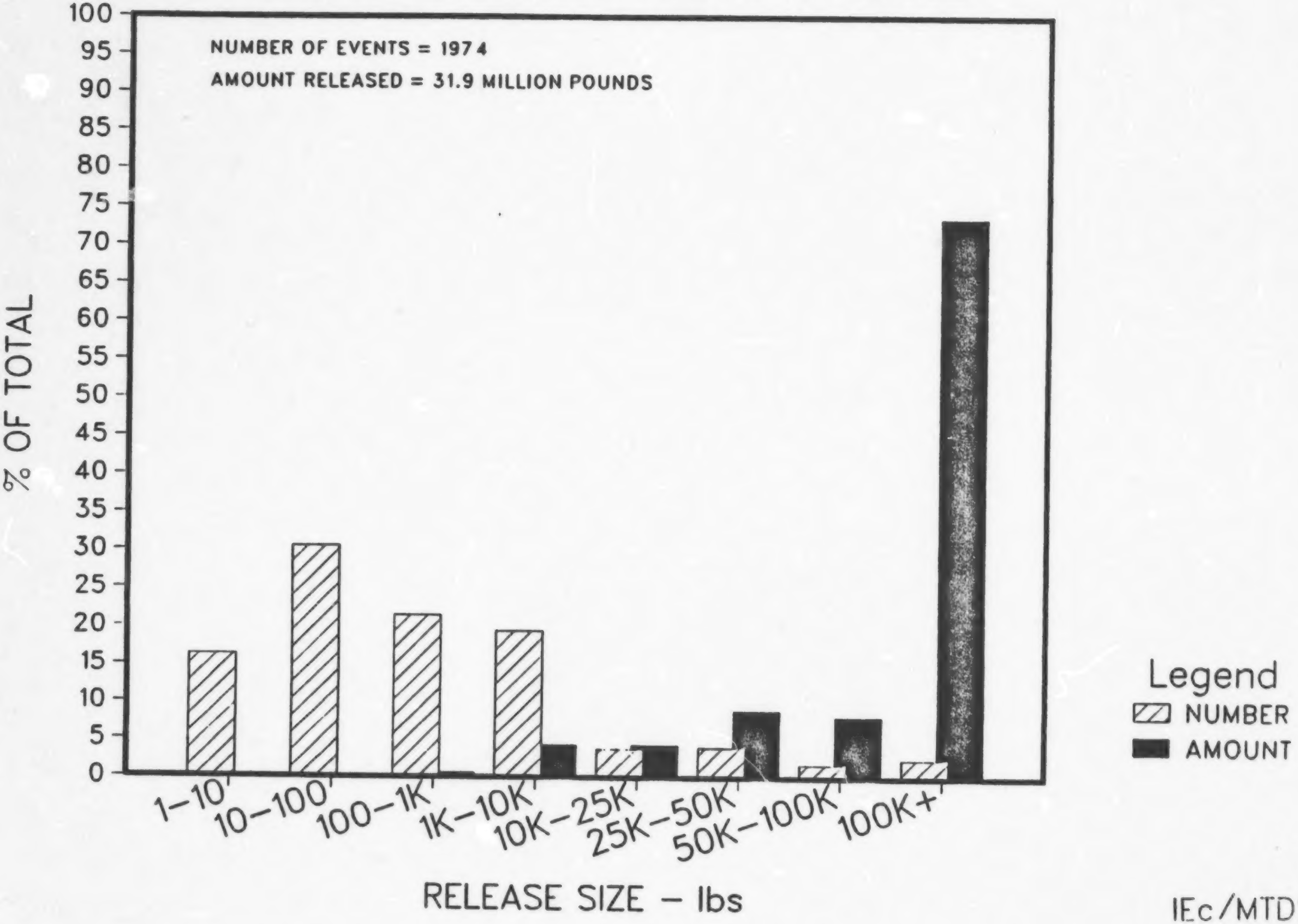
ACUTE HAZARDOUS EVENTS DATABASE
DISTRIBUTION BY RELEASE SIZE FOR IN-PLANT LOCATIONS
EVENTS INVOLVING UNKNOWN LOCATION



IEc/MT

Exhibit 48

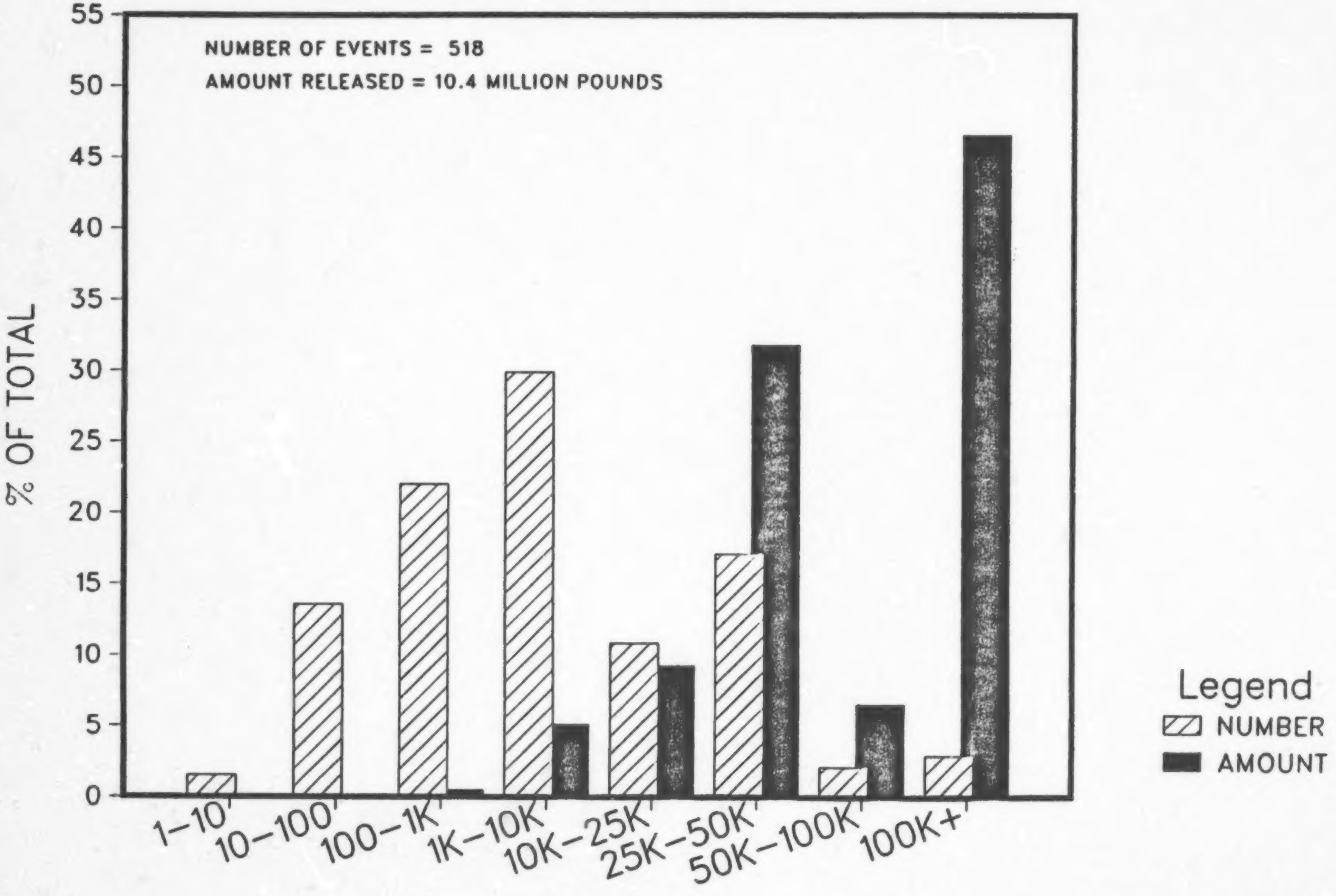
ACUTE HAZARDOUS EVENTS DATABASE
DISTRIBUTION BY RELEASE SIZE FOR IN-PLANT EVENTS INVOLVING EQUIPMENT FAILURE AS CAUSE



IEc/MTDS

Exhibit 49

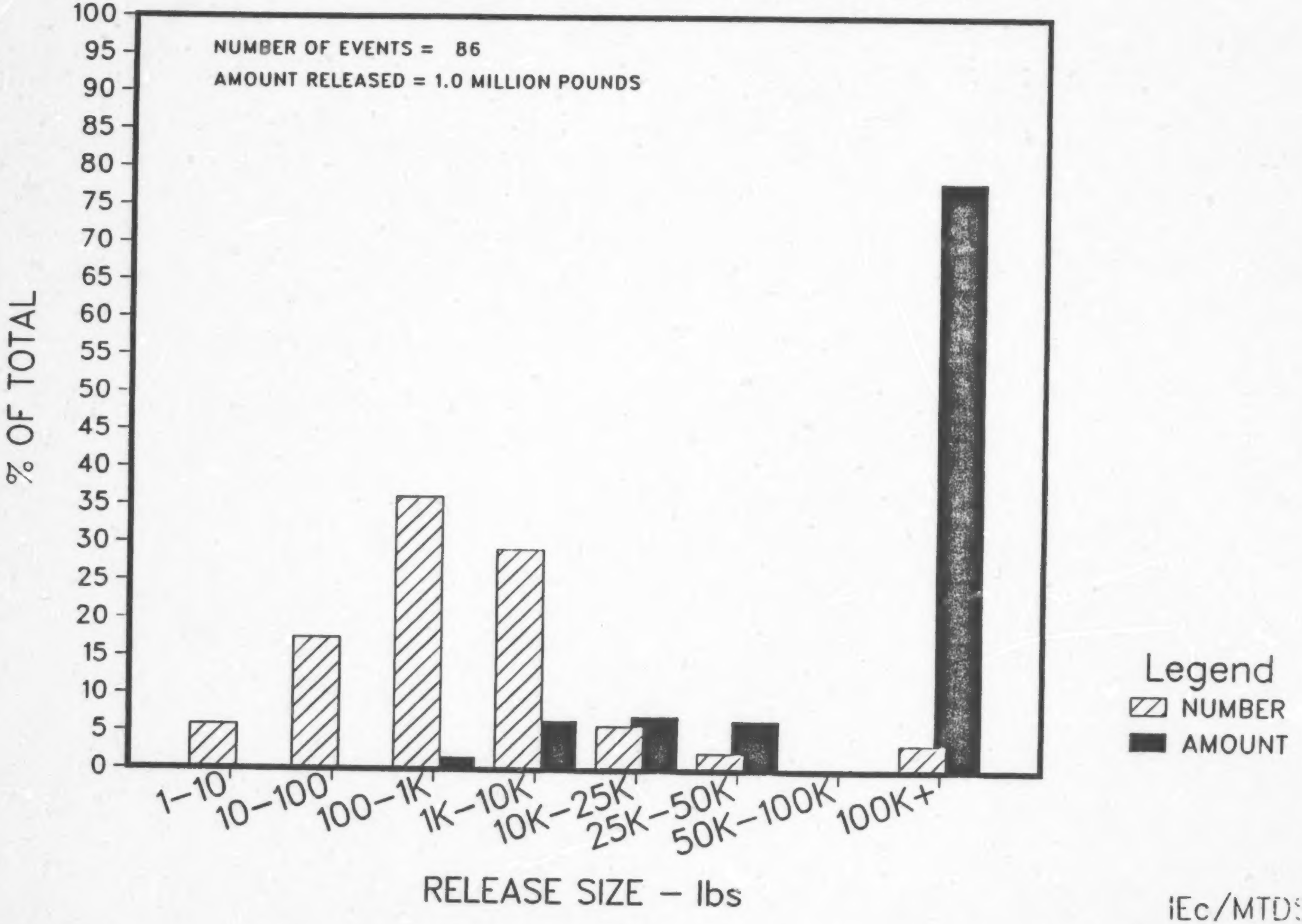
ACUTE HAZARDOUS EVENTS DATABASE DISTRIBUTION BY RELEASE SIZE FOR IN-PLANT EVENTS INVOLVING OPERATOR ERROR AS CAUSE



IEc/MITDS

Exhibit 50

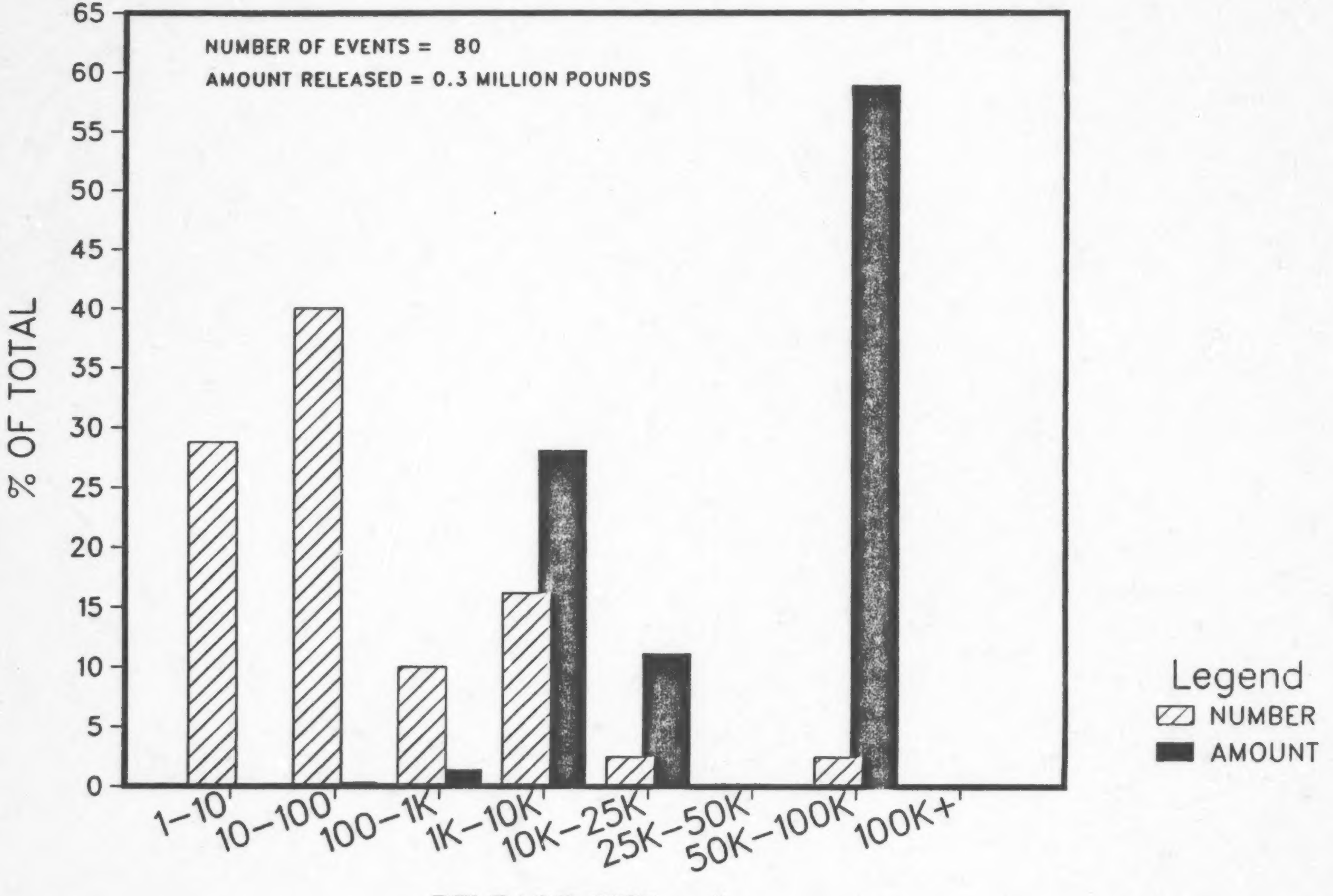
ACUTE HAZARDOUS EVENTS DATABASE DISTRIBUTION BY RELEASE SIZE FOR IN-PLANT EVENTS INVOLVING UPSET CONDITIONS AS CAUSE



iEc/MTDS

Exhibit 51

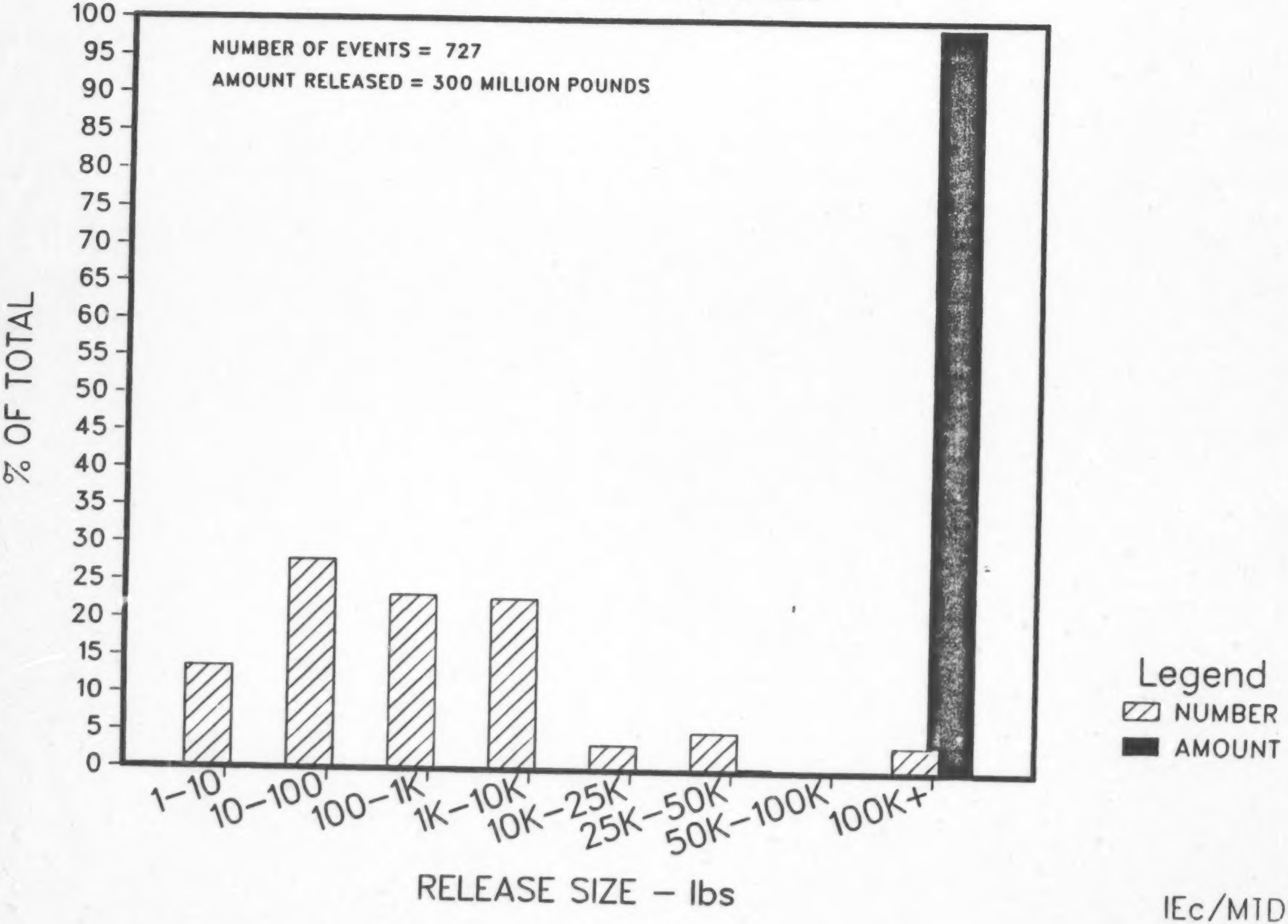
ACUTE HAZARDOUS EVENTS DATABASE DISTRIBUTION BY RELEASE SIZE FOR IN-PLANT EVENTS INVOLVING FIRE AS CAUSE



IEc/MTDS

Exhibit 52

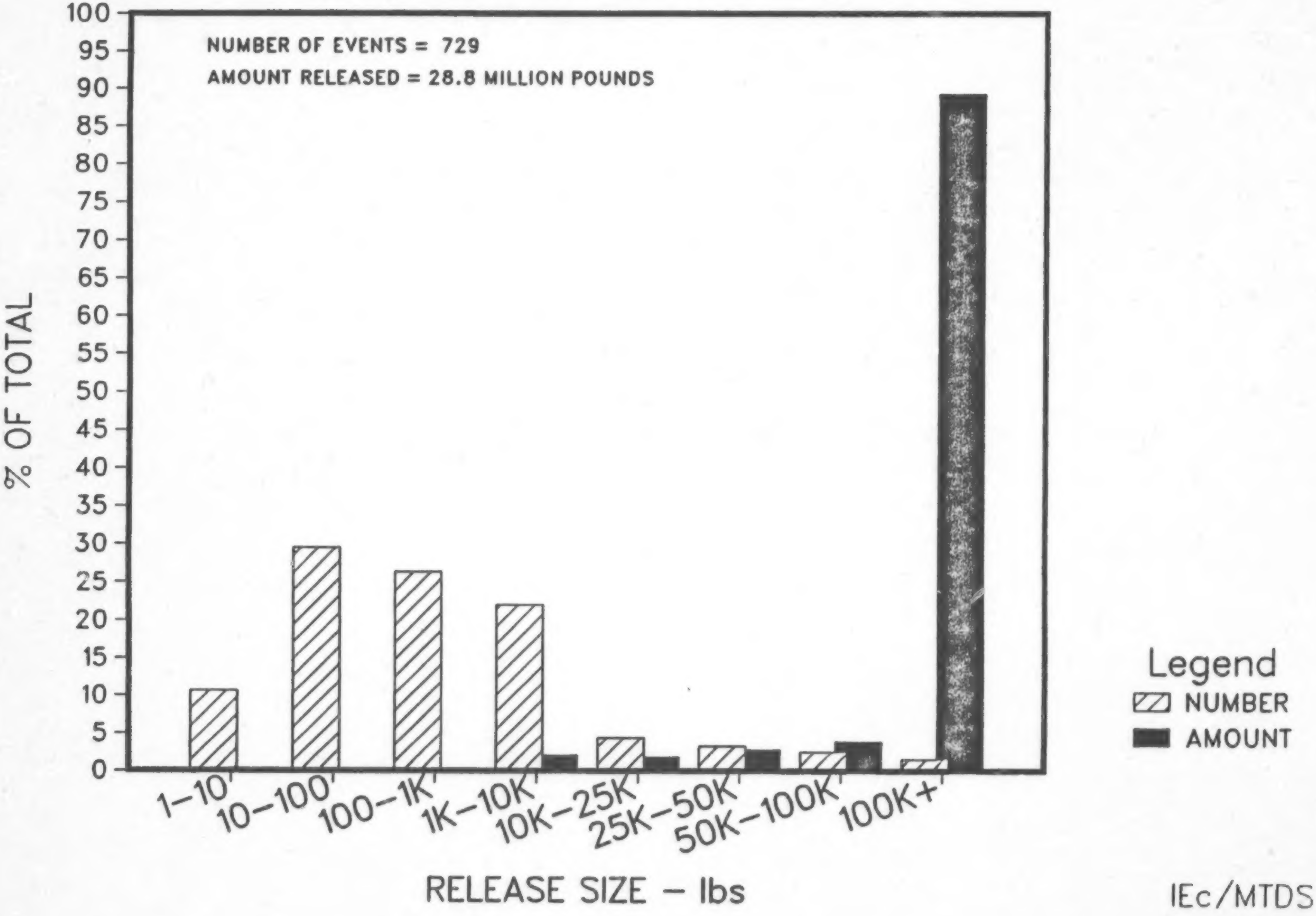
ACUTE HAZARDOUS EVENTS DATABASE
DISTRIBUTION BY RELEASE SIZE FOR IN-PLANT EVENTS INVOLVING OTHER CAUSES



IEc/MTDS

Exhibit 53

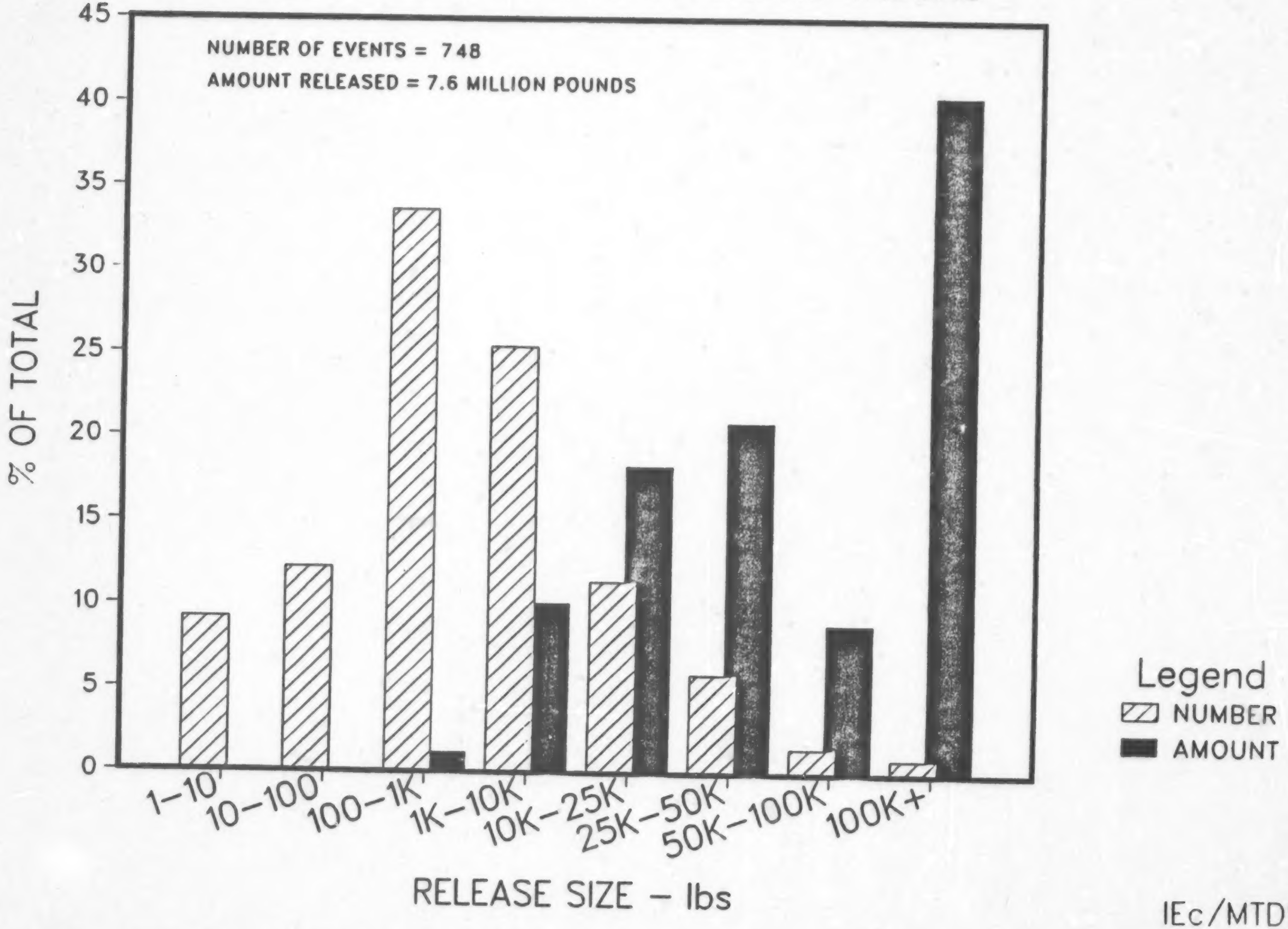
ACUTE HAZARDOUS EVENTS DATABASE
DISTRIBUTION BY RELEASE SIZE FOR IN-PLANT EVENTS INVOLVING UNKNOWN CAUSE



IEc/MTDS

Exhibit 54

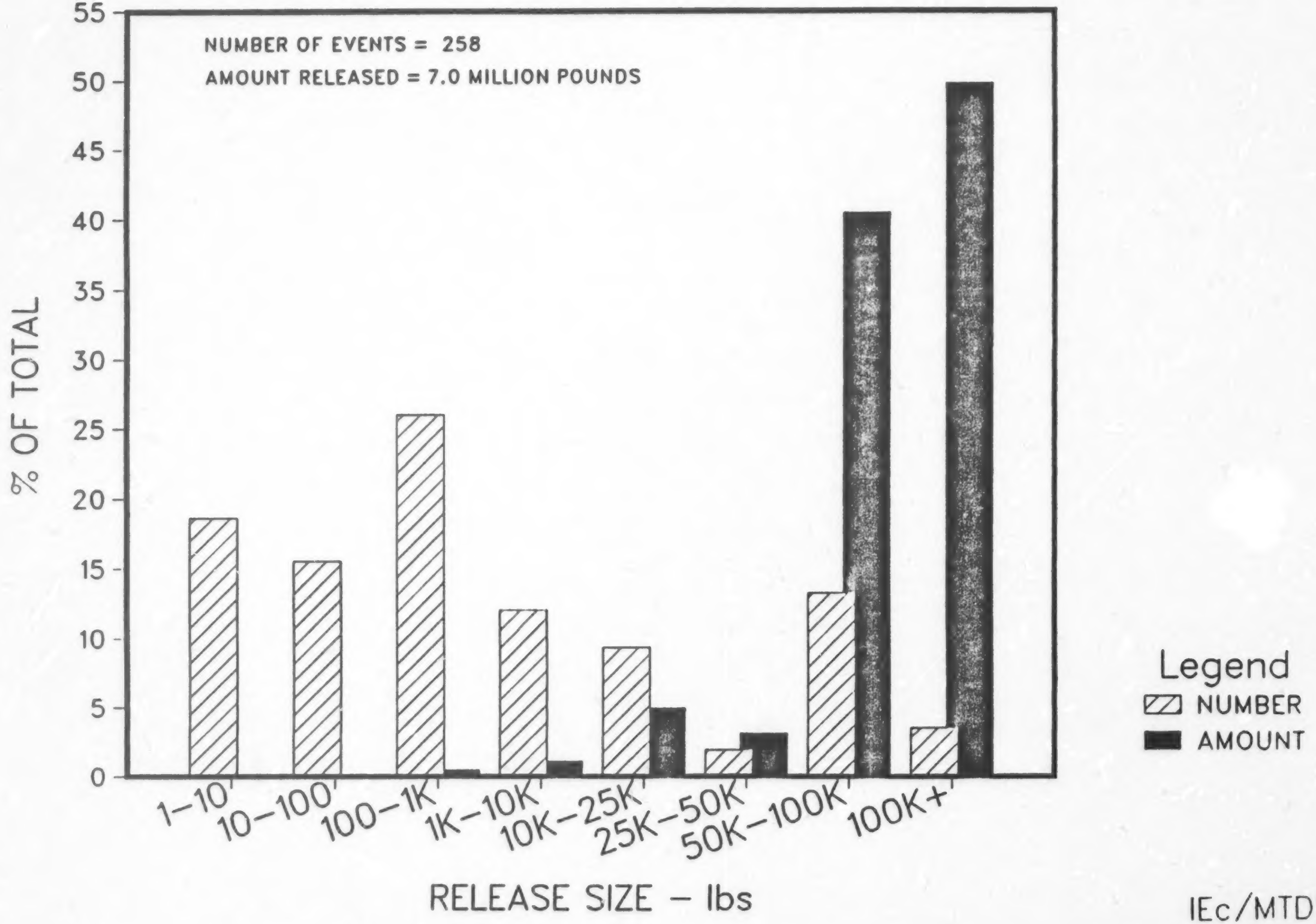
ACUTE HAZARDOUS EVENTS DATABASE DISTRIBUTION BY RELEASE SIZE FOR IN-TRANSIT EVENTS INVOLVING TRUCKS



IEc/MTDS

Exhibit 55

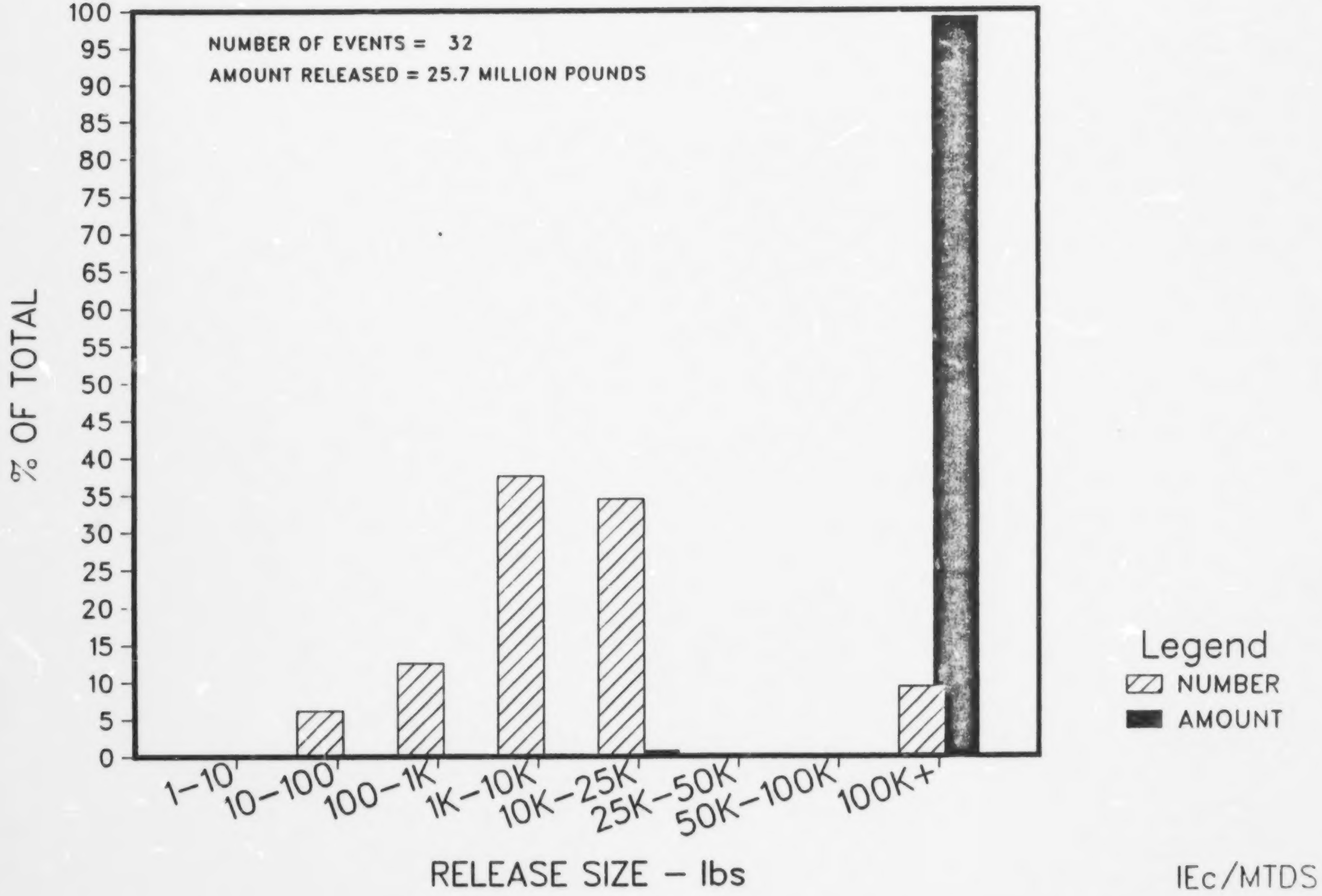
ACUTE HAZARDOUS EVENTS DATABASE DISTRIBUTION BY RELEASE SIZE FOR IN-TRANSIT EVENTS INVOLVING RAIL



IEc/MTDS

Exhibit 56

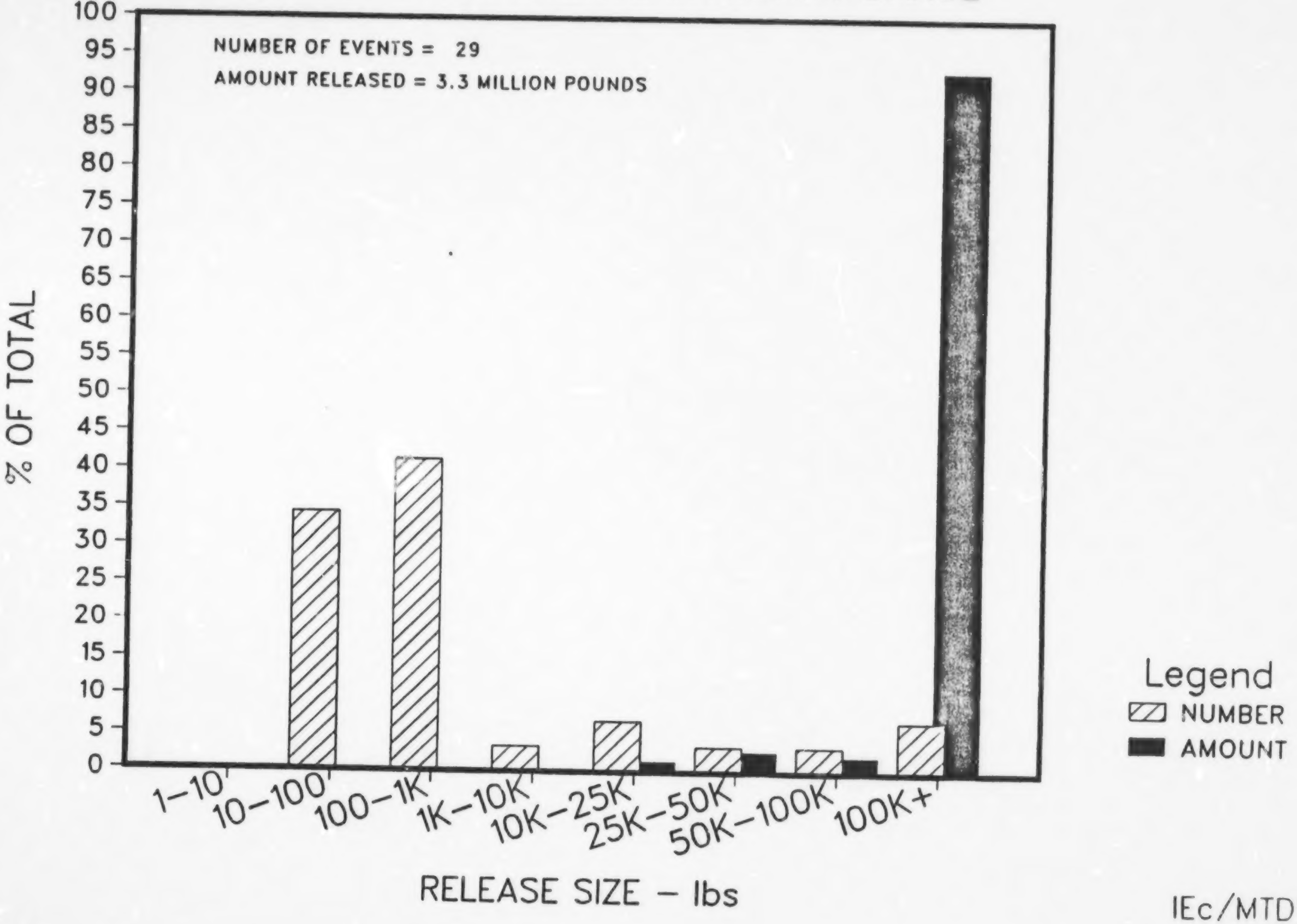
ACUTE HAZARDOUS EVENTS DATABASE DISTRIBUTION BY RELEASE SIZE FOR IN-TRANSIT EVENTS INVOLVING PIPELINE



IEc/MTDS

Exhibit 57

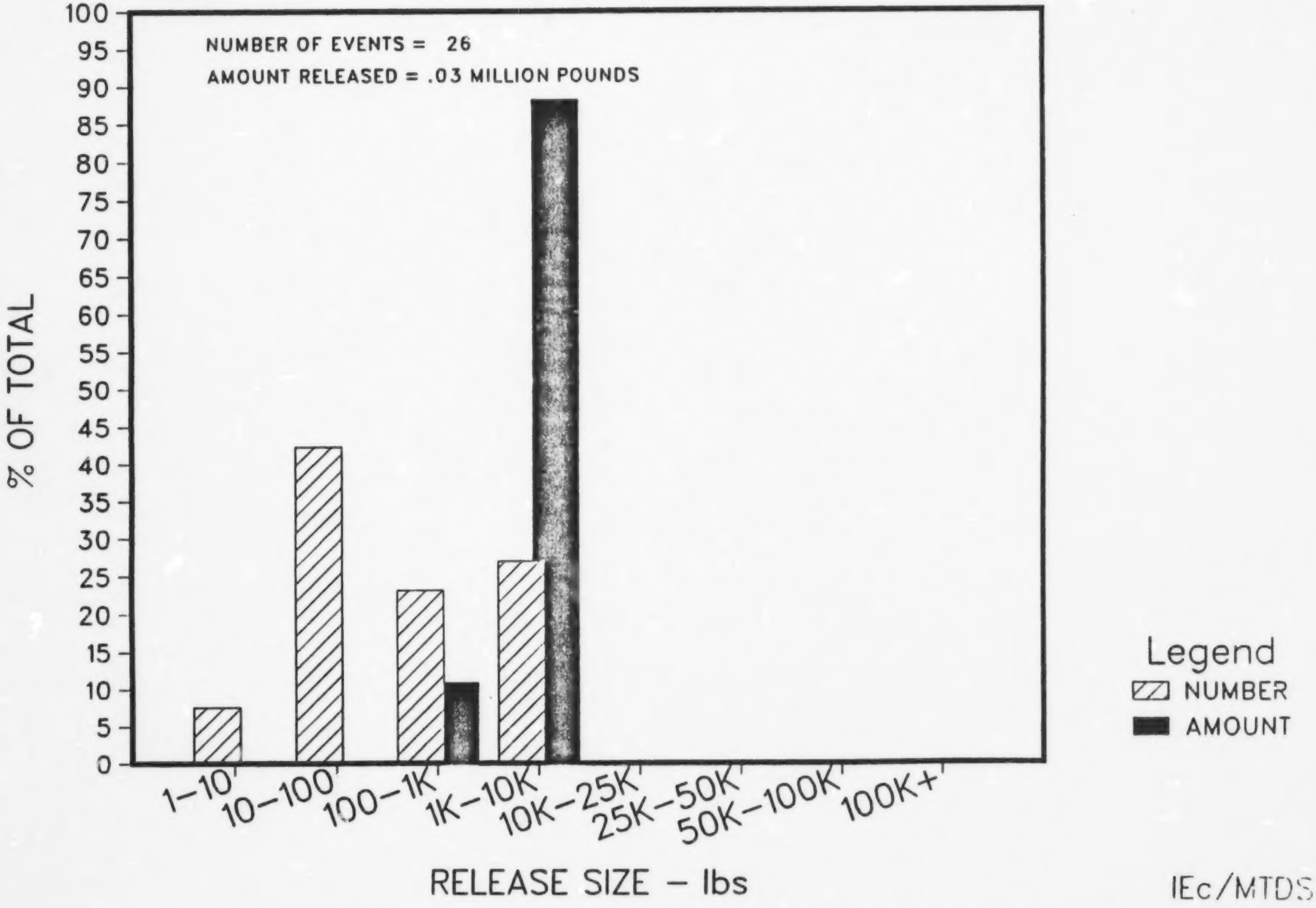
ACUTE HAZARDOUS EVENTS DATABASE DISTRIBUTION BY RELEASE SIZE FOR IN–TRANSIT EVENTS INVOLVING BARGE



IEc/MTDS

Exhibit 58

ACUTE HAZARDOUS EVENTS DATABASE DISTRIBUTION BY RELEASE SIZE FOR IN-TRANSIT EVENTS INVOLVING OTHER MODES



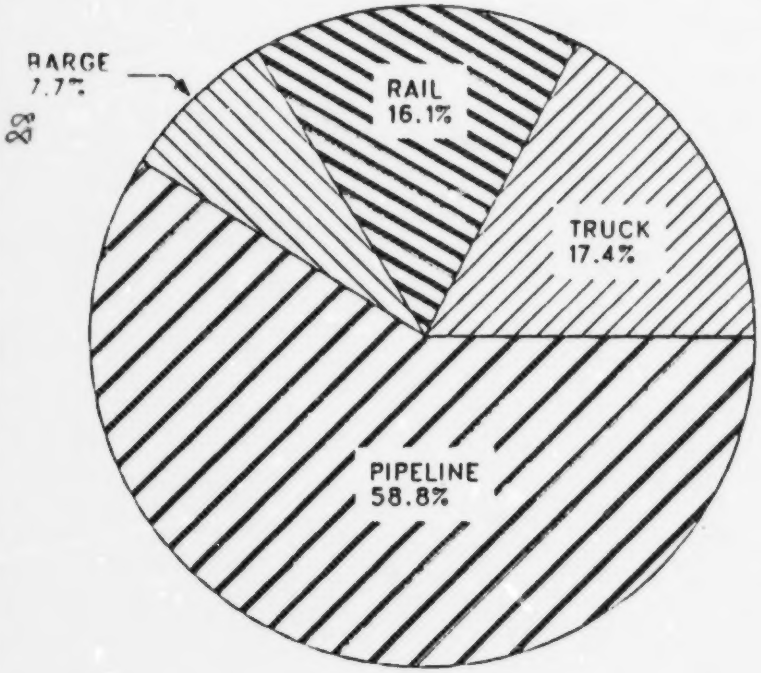
IEc/MTDS

Exhibit 59

ACUTE HAZARDOUS EVENTS DATABASE

IN—TRANSIT EVENTS BY MODE

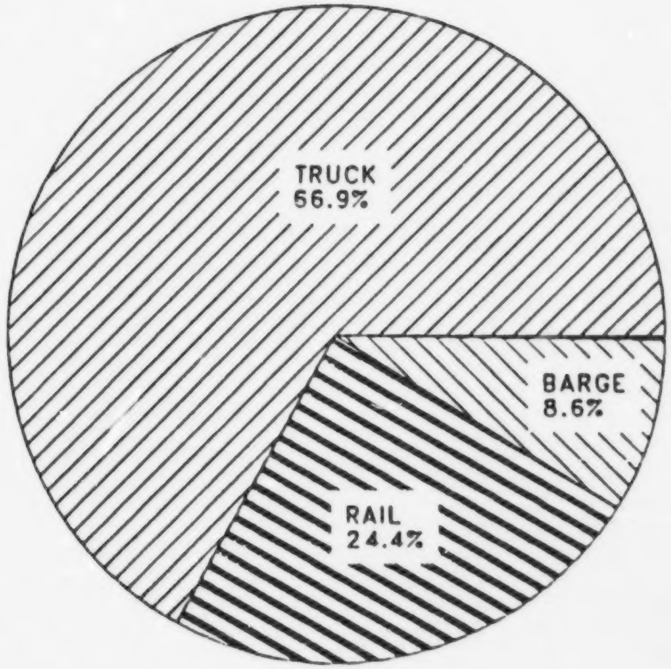
TOTAL AMOUNT RELEASED



NUMBER OF EVENTS = 1093

IN—TRANSIT EVENTS BY MODE

AMOUNT RELEASED IN DEATH/INJURY EVENT



NUMBER OF EVENTS = 93

IEc/MTD

APPENDIX A

DATA CODING AND FORMAT SHEETS

ACUTE HAZARDOUS EVENTS FILE **DATABASE ENTRY FORM** Page 1
(Circle Codes Where Appropriate)

1. Source > ______________
   ID > ________________

2. Date of Event > / /

3. Time of Day: Hour > Mins >

4. Event Location: Street Address >
   City >
   State >

5. Company Name >

6. Telephone Number: Area Code > Number > -

7. SIC >

8. Substances Involved:
   #1: State > SO/LQ/GS/SW/LW/GW/UU/UW Name >
   #2: State > SO/LQ/GS/SW/LW/GW/UU/UW Name >
   #3: State > SO/LQ/GS/SW/LW/GW/UU/UW Name >

   Comment >

9. Quantity Released:
   Substance #1 > Units > GA/LB/TN/CF
   Substance #2 > Units > GA/LB/TN/CF
   Substance #3 > Units > GA/LB/TN/CF

10. Affected Media: Air > Y/N/U
    Water > Y/N/U
    Land > Y/N/U

11. Duration of Event: Days > Hours > Mins >

12. Property Damage > Y/N/U

    Comment >

13. Environmental Damage > Y/N/U

    Comment >

14. Event Situation > P/T

    Comment >

If "In-Plant" Continue With 15. If "In-Transit" Go to 20.

******* FOR IN-PLANT EVENTS FILL IN 15 THROUGH 19 *******

15. In-Plant Location > PR/ST/VA/OT/UU

Comment >

16. Primary Cause of Event > EF/OE/CC/FI/OT/UU

Comment >

17. Operational Configuration > UP/DN/LL/SS/MT/OT/UU

Comment >

18. High Temperature Contributing > Y/N/U

19. High Pressure Contributing > Y/N/U

******************** GO TO LINE 22 *******************

-------- FOR IN-TRANSIT EVENTS FILL OUT 20 AND 21 --------

20. In-Transit Mode > R/T/B/P/O

21. In-Transit Accident Cause > CO/LK/OT/UU

------------------- CONTINUE WITH 22 ---------------

22. End Effect: Effect #1 > SP/FI/VR/EX/OT/UU
Effect #2 > SP/FI/VR/EX/OT/UU
Effect #3 > SP/FI/VR/EX/OT/UU
Effect #4 > SP/FI/VR/EX/OT/UU

Comment >

23. Injuries > Y/N/U

24. Number of People Injured:

25. Deaths > Y/N/U

26. Number of Deaths >

27. Evacuation Required > Y/N/U

Comment >

28. General Comments >

ACUTE HAZARDOUS EVENTS FILE

DATABASE ENTRY FORMAT

Size of Fields

1. Source: <3 character database identifier> c3
   ID : <Any record identifier from dataset> c70

   -- Each record MUST have a unique ID in order for it to be retrieved by the database for editing.

2. Date of Event: <MM/DD/YY> c2,c2,c2

   Enter -
   MM - Number of Month
   DD - Number of Day
   YY - Number of Year

   -- If the date is unknown, leave this blank. If the month and/or day is not known, enter "01" where necessary.

3. Time of Day: <Hours:Minutes> c2:c2

   Use the 24 hour clock convention.

4. Location of Event: <Address, City, State> c30,c20,c2

   -- Use P.O. state abbreviations

5. Company Name: <Name> c50

6. Telephone No.: <(Area Code)-Number> c3,c7

7. SIC Code: <Enter industry SIC, up to 4 digits> c4

8. Substances Involved:
   (1) <Physical State, Name> c2,c30
   (2) <Physical State, Name> c2,c30
   (3) <Physical State, Name> c2,c30

   Circle one of the following codes for physical state -

   SO - for Solid
   LQ - for Liquid
   GS - for Gas
   UU - for Unknown
   SW - for Solid Waste
   LW - for Liquid Waste
   GW - for Gaseous Waste
   UW - for Waste of Unknown State

   and -

   The name of the substance can be up to 30 characters long. If more than three substances are reported, enter the three largest here and place the remainder in the Comment field.

   Comments: c70

Size of Fields

9. Quantity Released: <Amount,Units> c9,c2

-- For each substance: enter a Number up to 9 digits - or - leave blank. If the quantity is provided in descriptive terms (e.g., "a small puddle") rather than in specific units, place that description in the General Comments field.

and -

Circle the appropriate Unit of Measure -
GA - Gallons
LB - Pounds
TN - Tons
CF - Cubic Feet

10. Affected Media:

Air: <Y/N/U> c1
Water: <Y/N/U> c1
Land: <Y/N/U> c1

Circle -
Y - Yes
N - No
U - Unknown

-- A response is required for each media. If the EFFECT (#22) is a fire or explosion, then AIR should be considered to be the only media affected, unless otherwise indicated by the data.

11. Duration of Event: <DDD/HH/MM> c3,c2,c2

Enter -
DDD - Number of Days, up to 3 digits
HH - Number of Hours, up to 2 digits
MM - Number of Months, up to 2 digits

12. Property Damage: <Y/N/U> c1

Circle -
Y - Yes
N - No
U - Unknown

-- A response MUST be selected.

Comment: c70

Size of Fields

13. Environmental Damage: <Y/N/U> c1

Circle -
Y - Yes
N - No
U - Unknown

-- A response MUST be selected.

Comment: c70

14. Event Situation: <P/T> c1

Circle -
P - If event occurred in plant
T - If event occurred during transit

-- A response MUST be selected.

Comment: c70

15. In-Plant Location: <PR/ST/VA/OT/UU> c2

Circle -
PR - Process Vessel
ST - Storage Vessel
VA - Valves or Piping
OT - Other
UU - Unknown

-- A response MUST be selected if the event is in-plant.

Comment: c70

16. Primary Cause of Event: <EF/OE/CC/FI/OT/UU> c2

Circle -
EF - Equipment Failure
OE - Operator Error
CC - Upset Condition
FI - Fire
OT - Other
UU - Unknown

-- A response MUST be selected if the event is in-plant.

Comment: c70

Size of Fields

17. Operational Configuration: <UP/DN/LL/SS/MT/OT/UU> c2

Circle -
- UP - Process Start-up
- DN - Process Shut Down
- LL - Loading or Unloading
- SS - Steady State
- MT - Maintenance
- OT - Other
- UU - Unknown

-- A response MUST be selected if the event is in-plant.

Comment: c70

18. High Temperature Contributing: <Y/N/U> c1

Circle -
- Y - Yes
- N - No
- U - Unknown

-- A response MUST be selected if the event is in-plant.

19. High Pressure Contributing: <Y/N/U> c1

Circle -
- Y - Yes
- N - No
- U - Unknown

-- A response MUST be selected if the event is in-plant.

20. In-Transit Mode: <R/T/B/P/O> c1

Circle -
- R - Rail
- T - Truck
- B - Barge
- P - Pipeline
- O - Other

-- A response MUST be selected if the event is in-transit.

Size of Fields

21. In-Transit Accident Cause: <CO/LK/OT/UU> c2

Circle -
CO - Collision
LK - Leak
OT - Other
UU - Unknown

-- A response MUST be selected if the event is in-transit.

22. End Effect: <SP/FI/VR/EX/OT/UU> c2,c2,c2,c2

Circle -
SP - Spill
FI - Fire
VR - Vapor Release
EX - Explosion
OT - Other
UU - Unknown

-- Codes MUST be selected for four effects. Assign "UU" as default values where necessary.

Comment: c70

23. Injuries: <Y/R/N/U> c1

Circle -
Y - Yes
R - Yes, the number of injuries is unknown
N - No
U - Unknown

-- A response MUST be selected.

24. Number of People Injured: <9999999, 0> c7

-- Enter up to 7 digits -- the default value is zero.

25. Deaths: <Y/R/N/U> c1

Circle -
Y - Yes
R - Yes, the number of deaths is unknown
N - No
U - Unknown

-- A response MUST be selected.

Size of Fields

26. Number of Deaths: <9999999, 0> c7

-- Enter up to 7 digits -- the default value is zero.

27. Evacuation Required: <Y/N/U> c1

Circle -
Y - Yes
N - No
U - Unknown

-- A response MUST be selected.

Comment: c70

28. General Comments: c280

Include here important information which is not included elsewhere, such as:

- descriptive information about release quantity,
- remedial response,
- value of property damaged,
- number of people hospitalized,
- extent of injuries,
- more information about the cause of the event, and
- important industry information.

APPENDIX B

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATABASE

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

AGENCY:	California Office of Emergency Services
NUMBER OF INCIDENTS PER YEAR:	About 1,700
PERIOD OF RECORDS USED:	1984 - 1985
NUMBER OF RECORDS USED:	141
BREAKDOWN OF INCIDENTS:	About 1,000 each year are oil spills, the rest chemical-related
TYPICAL TYPE OF RELEASE:	Many transportation incidents
MEDIA AFFECTED:	All, particularly land
SOURCE OF REPORT:	Companies needing assistance with clean-up, highway patrol, fire departments
PURPOSE OF SYSTEM:	Used by a warning control center which collects information pertaining to accidental releases and conveys the information to other agencies for appropriate clean-up actions
COMPUTERIZED?	A pilot project initiated in July 1984 to investigate after-effects of releases is currently being computerized
COMMENTS:	Very little information on causative factors; very little data on process releases

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

AGENCY:	Texas Air Control Board
NUMBER OF INCIDENTS PER YEAR:	Several thousand
PERIOD OF RECORDS USED:	1980 - 1985
NUMBER OF RECORDS USED:	442
BREAKDOWN OF INCIDENTS:	Majority of records do not list contaminants; of those listed, 60 to 70 percent are hazardous
TYPICAL TYPE OF RELEASE:	Equipment failures and maintenance releases are common
MEDIA AFFECTED:	Air only
SOURCE OF REPORT:	Companies within the state are required to report all upsets and maintenance-related releases
PURPOSE OF SYSTEM:	State schedules necessary inspections to the plants and takes appropriate regulatory action based upon the type and frequency of releases
COMPUTERIZED?	Yes
COMMENTS:	Little information on environmental impacts, causes, property damage, injuries, evacuation

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

AGENCY:	New Jersey Department of Environmental Quality
NUMBER OF INCIDENTS PER YEAR:	100 to 150
PERIOD OF RECORDS USED:	1983 - 1985
NUMBER OF RECORDS USED:	116
BREAKDOWN OF INCIDENTS:	About 75 to 80 percent of the incidents involve hazardous materials
TYPICAL TYPE OF RELEASE:	Mostly large releases; evacuations, injuries, fires, and explosions are common
MEDIA AFFECTED:	All
SOURCE OF REPORT:	Usually fire or police department
PURPOSE OF SYSTEM:	Unknown
COMPUTERIZED?	Currently developing system
COMMENTS:	No information on causes

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

AGENCY:	Ohio Environmental Protection Agency
NUMBER OF INCIDENTS PER YEAR:	200 to 300
PERIOD OF RECORDS USED:	1981 - 1985
NUMBER OF RECORDS USED:	263
BREAKDOWN OF INCIDENTS:	About 50 percent are citizen complaints which involve non-hazardous materials
TYPICAL TYPE OF RELEASE:	Mostly equipment failures and transportation incidents; anhydrous ammonia, sulfuric acid, and hydrochloric acid are commonly reported substances
MEDIA AFFECTED:	All
SOURCE OF REPORT:	Company (if serious release) or citizen complaint
PURPOSE OF SYSTEM:	Used as a priority-setting tool for investigating companies
COMPUTERIZED?	Yes
COMMENTS:	Well organized system backed up with hard copies which are easily accessible through incident report numbers

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

AGENCY:	U.S. Environmental Protection Agency, Region VII, Emergency Planning and Response Branch
NUMBER OF INCIDENTS PER YEAR:	About 1,500
PERIOD OF RECORDS USED:	1981 - 1985
NUMBER OF RECORDS USED:	513
BREAKDOWN OF INCIDENTS:	About one-third to one-half are oil spills
TYPICAL TYPE OF RELEASE:	All types of incidents, from very small to very large
MEDIA AFFECTED:	All, incidents evenly distributed among air, water, and land
SOURCE OF REPORT:	About 60 percent are from the company involved; the rest come from state agencies, the NRC, and private citizens
PURPOSE OF SYSTEM:	Used to prepare summary reports for the team that responds to the incident
COMPUTERIZED?	For the last two years
COMMENTS:	Well organized system

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

AGENCY:	National Response Center
NUMBER OF INCIDENTS PER YEAR:	About 10,000
PERIOD OF RECORDS USED:	1983 - 1984
NUMBER OF RECORDS USED:	1,225
BREAKDOWN OF INCIDENTS:	About 56 percent oil related, 25 percent non-CERCLA hazardous materials, and 19 percent CERCLA hazardous substances
TYPICAL TYPE OF RELEASE:	Many in-plant releases, typically due to equipment failure
MEDIA AFFECTED:	Water (42 percent) and land (30 percent). Air is less common (10 percent) and remainder are unknown.
SOURCE OF REPORT:	Companies are required to report incidents in which the quantity released is greater than the reportable quantity (RQ) for the substance involved. Complaints from private citizens are also included.
PURPOSE OF SYSTEM:	Single point of notification of federal authorities of any release of hazardous materials and other pollution incidents
COMPUTERIZED?	Yes
COMMENTS:	Operated by US Coast Guard. Little data on event duration, property damage, and environmental damage.

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

AGENCY:	California Highway Patrol
NUMBER OF INCIDENTS PER YEAR:	About 200 to 300
PERIOD OF RECORDS USED:	1983 - 1985
NUMBER OF RECORDS USED:	67
BREAKDOWN OF INCIDENTS:	About half are hazardous, but often very small quantities are involved
TYPICAL TYPE OF RELEASE:	All transportation releases
MEDIA AFFECTED:	Mostly land
SOURCE OF REPORT:	Unknown
PURPOSE OF SYSTEM:	Unknown
COMPUTERIZED?	No
COMMENTS:	No information on property or environmental damage and end effects

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

SOURCE:	New York Times (NYT)
NUMBER OF INCIDENTS PER YEAR:	10 to 15
PERIOD OF RECORDS USED:	1980 - 1984
NUMBER OF RECORDS USED:	46
BREAKDOWN OF INCIDENTS:	Major newsworthy accidents. Northeast U.S. focus, but nation-wide as well.
TYPICAL TYPE OF RELEASE:	In-plant and transport, with injuries, evacuations or deaths.
MEDIA AFFECTED:	All
SOURCE OF REPORT:	N.Y. Times and wire service reporters.
PURPOSE OF SOURCE:	News
COMPUTERIZED?:	Yes; full text on-line.
COMMENTS:	Larger events often duplicated in other news media sources (and later eliminated).

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

SOURCE: New Orleans Times-Picayunne (NTP)

NUMBER OF INCIDENTS PER YEAR: 33

PERIOD OF RECORDS USED: 1980 - 1981

NUMBER OF RECORDS USED: 65

BREAKDOWN OF INCIDENTS: Major newsworthy accidents along the Gulf Coast, plus larger national interest events. Many events of smaller consequence of local New Orleans interest.

TYPICAL TYPE OF RELEASE: Transportation and in-plant events with injuries, evacuations and deaths. Smaller local events tend to be transport collisions and some in-plant releases with small-scale evacuations.

MEDIA AFFECTED: All. More river spills than other news media.

SOURCE OF REPORT: New Orleans Times-Picayunne and wire service reporters.

PURPOSE OF SOURCE: News

COMPUTERIZED?: No

COMMENTS: Larger events often duplicated in other news media (and later eliminated).

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

SOURCE:	Chicago Tribune (CHT)
NUMBER OF INCIDENTS PER YEAR:	6
PERIOD OF RECORDS USED:	1980 - 1981
NUMBER OF RECORDS USED:	12
BREAKDOWN OF INCIDENTS:	Major newsworthy events in upper midwest
TYPICAL TYPE OF RELEASE:	In-plant and transport, with injuries, evacuations or deaths.
MEDIA AFFECTED:	All
SOURCE OF REPORT:	Chicago Tribune and wire services reporters
PURPOSE OF SOURCE:	News
COMPUTERIZED?:	No
COMMENTS:	Some larger events duplicated in other news sources (and later eliminated).

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

SOURCE: Los Angeles Times (LAT)

NUMBER OF INCIDENTS PER YEAR: 7

PERIOD OF RECORDS USED: 1979 - 1984

NUMBER OF RECORDS USED: 28

BREAKDOWN OF INCIDENTS: Major newsworthy events in California and more minor accidents, collisions etc. in L.A. area.

TYPICAL TYPE OF RELEASE: Both in-plant and transport, with injuries, evacuations or deaths.

MEDIA AFFECTED: All

SOURCE OF REPORT: L.A. Times and wire services reporters

PURPOSE OF SOURCE: News

COMPUTERIZED?: No

COMMENTS: Some larger events duplicated in other news sources (and later eliminated).

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

SOURCE:	United Press International (UPI)
NUMBER OF INCIDENTS PER YEAR:	62
PERIOD OF RECORDS USED:	April 1983 - July 1985
NUMBER OF RECORDS USED:	139
BREAKDOWN OF INCIDENTS:	Mostly major accidents with regional and national interest.
TYPICAL TYPE OF RELEASE:	Both in-plant and transport, with injuries, evacuations or deaths.
MEDIA AFFECTED:	All
SOURCE OF REPORT:	UPI reporters
PURPOSE OF SOURCE:	News
COMPUTERIZED?:	Yes; full text of stories on-line.
COMMENTS:	Some events duplicated in other news sources (and later eliminated).

DATA SOURCES USED FOR ACUTE HAZARDOUS EVENTS DATA BASE

SOURCE:	Marsh and McLennon (MM)
NUMBER OF INCIDENTS PER YEAR:	2 to 3
PERIOD OF RECORDS USED:	1956 - 1984
NUMBER OF RECORDS USED:	64
BREAKDOWN OF INCIDENTS:	The U.S. portion of MM's listing of the 100 largest industrial accidents, measured by property damage and economic loss. Cost per incident (estimated in 1985 dollars) ranges from $10 million to over $100 million.
TYPICAL TYPE OF RELEASE:	Mostly in-plant, with accidents either caused by or resulting in fires and explosions. Heavy emphasis on petroleum facilities, but chemicals processing is represented as well.
MEDIA AFFECTED:	Many air, but liquid spills to plant grounds (and later igniting) also frequent.
SOURCE OF REPORT:	MM's records -- apparently from a mix of their staff's investigations and published accounts.
PURPOSE OF SOURCE:	Safety engineering analysis and consulting services.
COMPUTERIZED?:	No
COMMENTS:	Most from 1980 on also appeared in one or more of the news sources (and duplicates were later eliminated.) Coded the pre-1980 events in order to have a larger number of major events of a coherent type for analysis, since these are relatively rare.

APPENDIX C

CHEMICALS IN THE ACUTE HAZARDOUS EVENTS DATABASE

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
1,1 Dichloroethane	2869	75-34-3			1	0	0	0
1,1,1 Trichloroethane	2869	71-55-6			6	0	0	2
1,1,2-Trichloroethane	2869	79-00-5			1	0	0	0
1,4-Diethylene Oxide	2869	123-91-1			1	0	0	0
1-Naphthyl N-Methyl Carbamate	2879	63-25-2			1	0	0	0
2,1,6 Dimethylcyclohexane	2865				1	0	0	0
2,2-Dibromo-3-Nitropropylamine	2869				2	0	0	2
2,4 D/ Banzo Mixture	2879	94-75-7			1	0	0	0
2,4,5-T/Paraquat	2879	93-76-5	1910-42-5	4685-14-7	1	0	0	0
2,4-Dichlorophenoxyacetic Acid	2879	94-75-7			1	0	0	1
2-2-Azobisisobutyronitrile	2869	78-67-1			1	0	0	0
2-Diazo-1-Naphthol-5-Sulfonic	2865				1	0	0	0
4,4-Isopropylidenediphenol	2865	80-05-7			2	0	0	0
ABS Resin	2821	9003-56-9			1	0	0	0
Acetaldehyde	2869	75-07-0			5	0	0	2
Acetate Homopolymer	2821				1	0	0	0
Acetic Acetate	2869				1	0	0	0
Acetic Acid	2869	64-19-7			15	5	0	1
Acetic Anhydride	2869	108-24-7			3	2	0	1
Acetone	2869	67-64-1			17	3	0	1
Acetone/Nitric Acid	2869	67-64-1			1	0	1	1
Acetonitrile	2869	75-05-8			4	0	0	0
Acetophenone	2865	98-86-2			1	0	0	0
Acetyl Chloride	2869	75-36-5			1	0	0	0
Acetylene	2813	74-86-2			4	1	0	1
Acid	2819				20	3	0	3
Acrolein	2869	107-02-8			2	0	0	1
Acrylamide	2869	79-06-1	110-26-9		4	1	0	1
Acrylate	2869	10344-93-1			3	0	0	1
Acrylate Polyamine	2821				1	0	0	0
Acrylic Acid	2869	79-10-7			4	1	0	0
Acrylic Coating	2821	9003-01-4			1	0	0	0
Acrylic Resin	2821	9003-01-4			1	1	0	0
Acrylonitrile	2869	107-13-1			20	7	2	3
Acrylonitrile/Butadiene	2869	107-13-1	106-99-0		1	0	0	0
Adhesive	2891				1	0	0	0

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Agricultural Chemicals	2870				4	0	0	0
Alcohol	2869				8	1	1	1
Aldehyde	2869	75-07-0	80-54-6		2	0	0	0
Aldicarb	2879	116-06-3			1	0	0	1
Aldrin	2879	309-00-2			1	0	0	0
Alkali	2812				2	1	0	1
Alkalyd Resin	2821				1	0	0	0
Alkyl Phenol	2865				1	0	0	0
Alkylate	2911				1	0	0	0
Alkyldimethybenzylammoniumchl	2865				1	0	0	0
Allyl Alcohol	2869	107-18-6			3	2	0	1
Allyl Chloride	2869	107-05-1			1	0	0	0
Allyl Glycidylether	2869	106-92-3			1	0	0	0
Alpha Methyl Styrene	2821	98-83-9			1	1	0	0
Alumina Hydrosol	2819				1	0	0	0
Aluminum	3300	7429-90-5			1	0	0	0
Aluminum Catalyst Base	2819				2	1	0	0
Aluminum Chloride	2819	7446-70-0	7784-13-6		2	0	0	0
Aluminum Diethylhydride	2819				1	0	0	0
Aluminum Phosphide	2819	20859-73-8			2	0	0	0
Aluminum Silicon Powder	2819				2	1	1	1
Aluminum Sulfate	2819	10043-01-3	10124-29-5	67112-80-5	1	0	0	0
Aluminum Triethyl	2819	97-93-8			3	0	0	0
Amine	2869				1	0	0	0
Ammonia	2873	1336-21-6	7664-41-7		1	0	0	0
Ammonia Sulfate	2819	7783-20-2			57	14	1	11
Ammonium Chloride	2819	12125-02-9			1	1	0	1
Ammonium Dichloride	2819				3	1	0	1
Ammonium Hydroxide	2819	1336-21-6			1	0	0	0
Ammonium Nitrate	2873	6484-02-2			8	0	0	0
Ammonium Nitrate Urea	2873	15978-77-5			10	1	0	3
Ammonium Persulfate	2819	7727-54-0			2	0	0	0
Ammonium Phosphate	2819	7722-76-1	7783-28-0	10124-34-9	1	0	0	0
Ammonium Salt	2819	53956-04-0			1	0	0	0
Ammonium Sulfate	2873	7783-20-2	10043-02-4	32736-64-4	1	0	0	0
Ammonium Sulfide	2819	12124-99-1	12135-76-1		1	1	0	0
					2	0	0	0

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Ammonium Thiosulfate	2819	7783-18-8			2	0	0	0
Amosol Naphtha HF395	2865				1	0	0	0
Anhydrous Ammonia	2873	7664-41-7			220	34	2	28
Anhydrous Dimethylamine	2869	124-40-3			1	0	0	1
Anhydrous Hydrochloric Acid	2819	7647-01-0			2	1	0	0
Anhydrous Hydrogen	2813	1333-74-0			1	1	0	1
Anhydrous Trimethylamine	2869	75-50-3			1	1	0	1
Aniline	2865	62-53-3			1	0	0	0
Anionic Polyacrylamide	2821				1	0	0	0
Antimony Pentachloride	2819	7647-18-9			1	0	0	0
Antimony Trioxide	2819	1309-64-4			1	1	0	0
Argon	2813	7440-37-1			2	0	0	1
Arsenate/Chromium/Copper	3300	7778-39-4	7440-47-3	7440-50-8	1	0	0	0
Arsenic	3300	7440-38-2			1	0	0	0
Arsenic Pentoxide	2819	1303-28-2			1	0	0	0
Asbestos	3292	1332-21-4			9	0	0	3
Asphalt	2911	8052-42-4			3	3	0	0
Asphalt Byproduct	2911				1	0	0	0
Asphalt Tar	2911				1	0	0	0
Atrazine	2879	1912-24-9			4	1	0	0
Atrazine/Lasso/Nitrogen	2879	1912-24-9	15972-60-8	7727-37-9	1	0	0	0
Azidodinitroethane	2869				1	1	0	1
Azobisisobutylnitrile	2869	78-67-1			1	0	0	0
Bactericide 400	2879				1	0	0	0
Ballast Tank Coating Flo-Coat	2899				1	0	0	0
Banueal 720	2879	8068-77-7			1	0	0	0
Banvel	2879	1918-00-9			2	0	0	0
Benzene	2865	71-43-2			26	5	1	2
Benzene/Ethanol	2865	71-43-2	64-17-5		2	0	0	0
Benzene/Toluene	2865	71-43-2	108-88-3		2	0	0	0
Benzyl Bromoacetate	2865	5437-45-6			1	1	0	0
Benzyl Chloride	2865	100-44-7	25168-05-2		1	0	0	0
Beta Phenyl Ethanol	2865	60-12-8			1	0	0	0
Bicep	2879	51218-45-2			1	0	0	0
Bis (2-Ethylhexyl) Phthalate	2869	117-81-7			1	0	0	0
Blasting Caps	2892				1	0	0	1

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Blue Dye	2816				2	0	0	0
Borex Resin	2821				1	0	0	0
Boron Trifluoride	2819	7637-07-2			1	0	0	0
Boron Trisulfate	2819				1	0	0	0
Bromochloroethane	2869	107-04-0			1	1	0	1
Bronze	3300	12597-70-5			1	0	0	0
Bunker "C" Oil	2911				1	0	0	0
Butadiene	2869	106-99-0			23	2	0	3
Butadiene Dimethyl Amine	2869				1	0	0	0
Butane	2869	106-97-8			13	5	1	2
Butane Mercaptan	2869	109-79-5	75-66-1		1	1	0	0
Butyl Acetate	2869	123-86-4			9	1	0	0
Butyl Acrylate	2869	106-63-8	141-32-2		2	0	0	0
Butyl Alcohol	2869	71-36-3			2	0	0	0
Butyl Creosol	2869	5736-70-9	2409-55-4		1	0	0	0
Butyl Isocyanate	2869	111-36-4			2	0	0	0
Butyl Mercaptan	2869	109-79-5			1	0	0	0
Butyl Methacrylate	2869	97-88-1			1	0	0	0
Butylene	2869	25167-67-3			1	0	0	0
Butylene	2869	25167-67-3			0	0	0	0
Cadmium Hydroxide	2819	29736-89-8			1	0	0	0
Cadmium Nitrate	2819	10325-94-7			1	0	0	0
Calcined Alumina	2819				1	0	0	1
Calcium Bromide	2819	7789-41-5			1	0	0	0
Calcium Carbide	2819	75-20-7			1	0	0	0
Calcium Chloride	2819	15606-71-0	10035-04-8	10043-52-4	1	0	0	1
Calcium Chlorine	2819				1	1	0	0
Calcium Hypochlorite	2819	7778-54-3			3	2	0	1
Calcium Nitrate	2819	10124-37-5			5	0	0	0
Calcium Oxide	2819	1305-78-8			3	0	0	0
Californium 252	3300	13981-17-4			1	0	0	0
Carbaryl	2879	63-25-2			1	0	0	0
Carbofuran	2879	1563-66-2			3	0	0	0
Carbon Bisulfide	2819	75-15-0			1	0	0	0
Carbon Black	2895	1333-86-4			1	0	0	0
Carbon Dioxide	2813	124-38-9			5	1	0	1

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Carbon Disulfide	2869	75-15-0			5	2	0	1
Carbon Monoxide	2813	630-08-8			13	0	0	0
Carbon Tetrachloride	2869	56-23-5			13	0	0	0
Carbon Tetrachloride/Chlorine	2869	56-23-5	7782-50-5		1	0	0	0
Carbon Tetrachloride/Disulfide	2869	56-23-5	75-15-0		1	0	0	0
Carboxin	2879	52-34-68-4			1	1	0	0
Catalyst	2819				3	0	0	0
Caustic	2812	13210-73-2			1	0	0	0
Caustic Soda	2812	1310-73-2			2	0	0	0
Chlordane	2879	57-74-9	12789-03-6		6	3	0	3
Chlorides	2819				2	0	0	0
Chlorinated Hydrocarbons	2869				2	1	0	0
Chlorinated Methane	2869				1	0	0	0
Chlorinated Rubber Chromate	2869				1	1	0	0
Chlorinated Solvents	2869				1	1	0	0
Chlorine	2812	7782-50-5			237	46	3	27
Chlorine Bleach	2812	8012-77-9			1	1	0	1
Chlorine Dioxide	2819	10049-04-4			1	0	0	0
Chlorobenzene	2865	108-90-7			2	0	0	0
Chloroethane	2869	75-00-3			1	0	0	0
Chloroform	2869	67-66-3			1	0	0	0
Chloropicrin	2869	76-06-2			1	1	0	0
Chloroprene	2822	126-99-8			2	1	0	1
Chlorosilanes	2819				1	0	0	0
Chlorothioformate	----	16890-85-0			2	0	0	0
Chrome	3300	7440-47-3			2	0	0	0
Chrome/Cobalt/Iron Acetonates	3300				1	0	0	0
Chromic Acid	2819	1333-82-0	7738-94-5	13530-68-2	15	2	0	3
Chromic Acid	2819	1333-82-0	7738-94-5	13530-68-2	0	0	0	0
Chromic Acid/Solvent	2819				1	0	0	0
Chromic Anhydride	2819	1333-82-0	7738-94-5		2	0	0	0
Chromium	3300	7440-47-3			3	0	0	0
Chromium Hydroxide	2819	12626-43-6	59330-19-7		1	0	0	0
Chromyl Chloride	2819	14977-61-8			1	0	0	0
Class B Poison	----				1	0	0	1
Cleaning Compound	2840				1	1	0	0

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Coal Ash	....				1	0	0	0
Coal Tar	2865	8007-45-2	8030-30-6	65996-89-6	1	1	1	0
Coal Tar Dye	2865				2	1	0	0
Combustible Gas	2813				1	0	0	0
Copper	3300	7440-50-8			2	0	0	0
Copper Oxide	2819	1317-38-0	1317-39-1	66020-58-4	1	0	0	0
Copper Sulfate	2819	1344-73-6	7758-98-7	17599-81-4	3	1	0	1
Corrosive Alkaline Liquid	2812				1	0	0	0
Corrosive Material	2819				2	1	0	0
Creosote	2865	8001-58-9	8021-39-4		7	0	0	0
Creosote/Coal Tar	2865	8001-58-9	8021-39-4	8007-45-2	5	0	0	0
Cresol	2865	108-39-4	1319-77-3		1	0	0	0
Cresylic Acid	2865	95-48-7	1319-77-3		1	1	0	0
Crude Oil	2911	8002-05-9			15	6	1	4
Cumene	2865	98-82-8			3	0	0	0
Cumene Hydroxide	2865				1	0	0	0
Cyanide	2819	57-12-5			7	3	0	2
Cyclohexane	2865	110-82-7	108-94-1		9	0	0	1
Cyclohexanone	2865	108-94-1			1	0	0	0
Cyclohexanone/MEK	2865	108-94-1	78-93-3		1	0	0	0
Cyclohexyl Mercaptan	2865	1569-69-3			2	0	0	0
Denatured Alcohol	2869				2	0	0	0
Detergent	2841				1	0	0	0
Di-Xylylene	2865	1633-22-3	2319-97-3		1	0	0	0
Diallyl Maleate	2869	999-21-3			1	0	0	0
Diaminodiphenylmethane	2869	101-77-9			1	0	0	0
Diaminodithenylmethane	2869				1	0	0	0
Diatomaceous Earth	1400				2	0	0	0
Diazinon	2879	333-41-5			4	0	0	1
Dibromochloropropane	2879	96-12-8	67708-83-2		1	0	0	0
Dichlorobenzene	2865	106-46-7	25321-22-6		1	0	0	0
Dichlorodifluoromethane	2869	75-71-8			2	0	0	0
Dichloroethane	2869	1300-21-6	75-34-3	107-06-2	1	0	0	0
Dichloroethyl Ether	2869	111-44-4			1	0	0	0
Dichloroethylene	2869	107-06-2	25323-30-2		1	0	0	0
Dichlorofluoromethane	2869	75-43-4			1	0	0	0

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Dichloromethane	2869	75-09-2			6	1	0	0
Dichlorophenol	2865	25167-81-1			1	0	0	0
Dichloropropane	2869	78-87-5	26638-19-7		1	0	0	0
Dichlorosilane	2819	4109-96-0			1	0	0	1
Dicyamideamine	2869				1	1	0	0
Dicyclopentadiene	2865	77-73-6			2	0	0	0
Diesel Fuel	2911	68334-30-5			4	2	0	3
Diethyl Aluminum Chloride	2819	96-10-6			1	0	0	0
Diethyl Carbonate	2869	105-58-8			1	0	0	0
Diethyl Chloroformate	2869				1	0	0	0
Diethyl Ether	2869	60-29-7			2	0	0	0
Diethylamine	2869	109-89-7			2	1	0	0
Diethylene Triamine	2869	111-40-0			1	0	0	0
Diethylmetriamine	2869				1	0	0	0
Difluoromethane	2869	75-10-5			1	0	0	0
Diisobutylamine	2869	110-96-3			1	0	0	1
Diisobutylene	2869	25167-70-8			1	0	0	0
Diisononyl Adipate	2869	33703-08-1			1	0	0	0
Diisopropenol Amine	2869				1	0	0	0
Diisopropyl Ether	2869	108-20-3			1	0	0	0
Dimethyl Carbonate	2869	616-38-6			2	0	0	0
Dimethyl Ether	2869	115-10-6			2	0	0	0
Dimethyl Ketone	2869	67-64-1			1	0	0	0
Dimethyl Sulfate	2869	77-78-1			1	0	0	0
Dimethyl Sulfide	2869	75-18-3			1	0	0	1
Dimethyl Sulfoxide	2869	67-68-5			2	1	0	1
Dimethylamine	2869	124-40-3			6	3	0	3
Dimethylate	2869				1	0	0	0
Dimethylester	2869				1	0	0	0
Dinitrotoluene	2865	25321-14-6			1	0	0	0
Dioctyl Phthalate	2865	117-81-7	117-84-0		1	0	0	0
Diphenylmethane Diisocyanate	2865	101-68-8	26447-40-5		1	0	0	1
Diphenyloxazole	2865	92-71-7			1	1	0	1
Dipropylene Glycol Methyl Ethe	2869	34590-94-8			1	0	0	0
Disulfide	····				2	0	0	0
Dodecylbenzene Sulfonic Acid	2865	11067-81-5	27176-87-0		1	0	0	0

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Dodecylbenzene/Sulfuric Acid	2865	123-01-3	7664-93-9		1	0	0	0
Dual 8E	2879	51218-45-2			1	0	0	0
Dual/Bladex	2879	757-58-4	21725-46-2	51218-45-2	1	0	0	0
Endosulfan	2879	115-29-7	33213-65-9		1	1	0	1
Epichlorohydrin	2869	106-89-8			2	0	0	0
Epoxy Resin	2821				2	1	0	0
Ethanol Benzene	2865	64-17-5	71-43-2		1	0	0	0
Ether	2869	60-29-7			1	0	0	0
Ethyl Acetate	2869	141-78-6			4	0	1	0
Ethyl Acrylate	2869	140-88-5			18	3	0	1
Ethyl Alcohol	2869	64-17-5			10	3	1	1
Ethyl Benzene	2865	100-41-4			3	0	0	0
Ethyl Chloride	2869	75-00-3			4	0	0	0
Ethyl Chloroformate	2869	541-41-3			2	0	0	0
Ethyl Ether	2869	60-29-7			3	0	0	0
Ethyl Foaming Agent "B"	2899				1	0	0	0
Ethyl Hexanol	2869	104-76-7			1	0	0	0
Ethyl Mercaptan	2869	75-08-1			3	0	0	1
Ethyl Parathion	2879	56-38-2			1	0	0	0
Ethylamine	2869	75-04-7			2	1	1	0
Ethylene	2869	74-85-1			42	1	1	1
Ethylene Chloride	2869	107-06-2			2	1	0	1
Ethylene Diamine	2869	107-15-3			8	0	0	2
Ethylene Diamine Tetraacetic	2869	60-00-4			1	0	0	0
Ethylene Dibromide	2869	106-93-4			1	0	0	0
Ethylene Dichloride	2869	107-06-2			26	0	0	0
Ethylene Dichloride/VC	2869	106-93-4	75-01-4		1	0	0	0
Ethylene Glycol	2869	107-21-1			6	0	0	0
Ethylene Glycol Monohexylether	2869	112-25-4			1	0	0	0
Ethylene Oxide	2869	75-21-8			27	2	0	4
Explosives	2892				5	3	3	2
Ferric Chloride	2819	7705-08-0			7	2	0	2
Ferric Sulfate	2819	10028-22-5			1	0	0	0
Fertilizer	2870				29	4	0	3
Fertilizer/Pesticide	2870				1	0	0	0
Fireworks	2892				1	1	1	1

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Flammable Chemicals	2860				1	1	0	0
Flammable Gas	2860				2	0	0	0
Flammable Liquid	2860				4	2	1	2
Flammable Material	2860				1	1	0	0
Flammable Oil	2911				1	0	0	1
Flammable Product	2860				4	0	0	0
Flammable Resin	2821				1	0	0	0
Flammable Waste	----				1	0	0	0
Flue Dust	----	67711-90-4			1	1	0	0
Fluoride	2819	16984-48-8			1	0	0	0
Fluorine	2819	7782-41-4			1	0	0	0
Fluorosulfonic Acid	2819	7789-21-1			1	0	0	1
Fly Ash	----				1	0	0	0
Formaldehyde	2869	50-00-0			15	2	0	3
Formic Acid	2869	64-18-6			1	0	0	0
Freon	2869	75-45-6	11126-05-9		3	2	0	2
Freon 12	2869	75-71-8			1	0	0	0
Fuel	2911				2	1	1	1
Fuel Oil	2911				5	2	0	1
Fumaric Acid	2869	110-17-8			1	0	0	0
Fungicides	2879				1	0	0	1
Furadan	2879	1563-66-2			3	0	0	1
Furadan - 10G - Granuale	2879	1563-66-2			1	0	0	0
Furan	2865	110-00-9			1	0	0	0
Furfural	2865	98-01-1			2	0	0	0
Gasoline	2911	8006-61-9			17	10	6	8
Gluconic Acid	2869	526-95-4	133-42-6		1	0	0	0
Grain Liquor	2869				1	0	0	1
Hazardous Waste	----				5	2	0	0
Hazardous Waste Aciu	----				1	0	0	0
Heating Oil	2911				1	0	0	1
Heavy Metals Sludge	----				1	0	0	1
Heptane	2869	142-82-5			1	0	0	1
Heptanol Ketone	2869				1	0	0	0
Herbicide	2879				9	2	0	1
Herbicide/Fertilizer	2879				1	0	0	0

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Hexachlorobenzene	2865	118-74-1			1	0	0	0
Hexachlorobutadiene	2869	87-68-3			1	0	0	0
Hexachlorocyclopentadiene	2865	77-47-4			1	1	0	0
Hexadiene	2869	592-42-7	42296-74-2		1	0	0	0
Hexadiene/Hydrocarbons	2869	592-42-7	42296-74-2		1	0	0	0
Hexamine	2869	100-97-0			1	0	0	0
Hexane	2869	110-54-3			19	3	1	1
Hexane/Propylene	2869	110-54-3	115-07-1		1	0	0	0
Hexylethyldichloride	2869				1	0	0	0
Hexylmethylamine	2869	35161-70-7			1	0	0	0
Hydrazine	2869	302-01-2			2	0	0	0
Hydrobromic Acid	2819	10035-10-6			1	1	0	1
Hydrocarbon/Vinyl	2860				1	0	0	0
Hydrocarbons	2860				18	4	3	2
Hydrocarbons/Solvents	2860				1	0	0	0
Hydrochloric Acid	2819	7647-01-0			130	26	0	28
Hydrofluoric Acid	2819	7664-39-3			11	1	0	1
Hydrofluosilicic Acid	2819	16961-83-4			1	0	0	0
Hydrogen	2813	1333-74-0			8	2	0	4
Hydrogen Bromide	2819	10035-10-6			1	0	0	1
Hydrogen Chloride	2819	7647-01-0			9	0	0	0
Hydrogen Cyanide	2819	74-90-8	24993-07-5		12	2	0	3
Hydrogen Fluoride	2819	7664-39-3			4	1	0	2
Hydrogen Peroxide	2819	7722-84-1			7	0	0	0
Hydrogen Sulfide	2819	7783-06-4			52	5	2	5
Hydrogen/Nitrogen	2813	1333-74-0	7727-37-9		1	1	0	0
Hydroxide	2810	1310-73-2			1	0	0	0
Hydroxylethyl Acrylate	2821	818-61-1			1	0	0	0
Hypochlorite	2819	7778-66-7			2	1	0	1
Ink Base	2851				1	0	0	0
Ink Solvents	2851				1	0	0	0
Insecticide	2879				7	2	0	0
Insecticides	2879				1	0	0	0
Iron	3300	7439-89-6			1	0	0	0
Iso-A-Propylamine	2869	75-31-0			1	0	0	0
Iso-Phthalonitrile	2865	626-17-5			1	0	0	0

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Isobutane	2869	75-28-5			6	1	0	2
Isobutyl Acetate	2869	110-19-0			1	0	0	0
Isobutylene	2869	75-28-5	115-11-7		1	0	0	0
Isocyanate	2865	71000-82-3			1	0	0	0
Isoparaffinic Hydrocarbon	2869				1	0	0	0
Isopentane	2869	78-78-4			2	0	0	0
Isoprene	2869	78-79-5			6	0	0	0
Isopropyl Acetate	2869	108-21-4			4	1	0	0
Isopropyl Alcohol	2869	67-63-0			5	1	1	2
Isopropyl Chloride	2869	75-29-6			1	0	0	0
Jet Fuel	2911				1	0	0	0
Kelthane 35	2879	115-32-2			1	1	0	0
Kerosene	2911	8008-20-6	70892-10-3		6	0	0	2
Kerosene/Pesticide	2911	8008-20-6			1	0	0	0
Lacquer	2851				3	3	2	1
Lacquer Base	2851				1	0	0	0
Lactic Acid	2869	50-21-5			1	0	0	0
Lasso	2879	15972-60-8			9	0	0	0
Lasso Atrazine	2879	15972-60-8	1912-24-9		1	0	0	0
Latex	2821	9016-00-6			1	0	0	0
Lead	3300	7437-92-1			4	0	0	1
Lead Acid Batteries	2899				1	1	0	0
Lead Chromate	2819	7758-97-6			1	0	0	0
Lead Oxide	2819	1309-60-0	1314-41-6	1317-36-8	2	0	0	0
Lead Styphnate	2819	15245-44-0			2	0	0	1
Lead Sulfide	2819	1314-87-0	12179-39-4		1	0	0	0
Light Hydrocarbons	2911				1	1	1	0
Light Oil	2911				1	1	1	0
Lime	2812	1305-78-8			2	1	0	0
Lindane	2879	58-89-9	608-73-1		1	0	0	1
Lindane/Malathion	2879	58-89-9	608-73-1	121-75-5	1	0	0	0
Liquefied Natural Gas	2911	64741-48-6			1	0	0	0
Liquid Dye	2816				1	0	0	0
Liquid Hydrogen	2813	1333-74-0			1	0	0	0
Liquid Nitrogen	2813	7727-37-9			4	1	0	0
Liquid Oxygen	2813	7782-44-7			4	0	0	1

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Liquid Waste	----				1	0	0	0
Lithium Hydride	2819	7580-67-8			1	1	0	0
Lorsban	2879	2921-88-2			1	0	0	0
M-Xylene	2865	108-38-3			4	1	0	0
MC 800	----				2	0	0	0
Magnesium	3300	7439-95-4			4	1	1	2
Magnesium Chloride	2819	7786-30-3	7791-18-6	15230-53-2	1	0	0	0
Magnesium Salt Slurry Sulfinat	2819				1	0	0	1
Malathion	2879	121-75-5			9	3	1	2
Maleic Anhydride	2865	108-31-6			2	1	1	0
Melathyone	2879	121-75-5			1	1	0	0
Mercaptan	2869				8	2	0	0
Mercury	2819	7439-97-6			5	0	0	0
Mereacrylic Acid	----				1	0	0	0
Mesityl Oxide	2869	141-79-7			1	1	0	0
Metabisulfate	2819				1	1	0	0
Metacresol	2865	108-39-4			1	0	0	0
Methaldeheyde	2869	50-00-0			1	0	0	0
Methane	2869	74-82-8			2	1	1	1
Methane Diisocyanate	2869				1	1	0	0
Methyl Acrylate	2821	96-33-3			5	4	2	2
Methyl Alcohol	2869	67-56-1			34	2	0	4
Methyl Bis Acrylamide	2821				1	0	0	0
Methyl Bromide	2869	74-83-9	16519-97-4		5	3	1	5
Methyl Chloride	2869	74-87-3			89	0	0	0
Methyl Chloroform	2869	71-55-6	25323-89-1		2	1	0	1
Methyl Chloroformate	2869	79-22-1			2	0	0	0
Methyl Ethyl Ketone	2869	78-93-3			23	2	3	2
Methyl Ethyl Ketone Peroxide	2869	1338-23-4			1	0	0	0
Methyl Iodide	2819	74-88-4			4	1	0	0
Methyl Isobutyl Ketone	2869	105-44-2	108-10-1		4	0	0	0
Methyl Isocyanate	2869	624-83-9			1	1	0	1
Methyl Isocyanite	2869	624-83-9			1	0	0	0
Methyl Mercaptan	2869	74-93-1			8	2	0	0
Methyl Methacrylate	2821	80-62-6			7	2	0	2
Methyl Parathion	2879	298-00-0			1	0	0	0

SUMMARY OF SUBSTANCES
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SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Methyl Thiazol	2869	3581-87-1	693-95-8	3581-89-3	1	0	0	0
Methyl-Tert-Butyl Ether	2869	1634-04-4			1	0	0	0
Methyl-tert-Butyl Ether	2869	1634-04-4			1	0	0	0
Methylamine	2869	74-89-5			1	0	0	0
Methylene Chloride	2869	75-09-2			15	2	0	1
Methylmercaptan	2869	74-93-1			3	1	0	0
Mineral Oil	2911	8012-95-1	8020-83-5	8042-47-5	1	0	0	0
Mineral Spirits	2911	8030-30-6	8032-32-4		3	0	0	0
Mixed Acids	2819				1	0	0	0
Mono Isobutyl Amine	2869	78-81-9			1	0	0	0
Monoaluminum Phosphate	2819	7784-30-7			1	0	0	0
Monoammonium Nitrate	2873	6484-52-2			1	0	0	0
Monochlorobenzene	2865	108-90-7			6	2	0	1
Monochlorofluoromethane	2869	593-70-4			1	0	0	0
Monoethanolamine	2869	141-43-5			1	1	0	1
Monovinylacetylene	2869	689-97-4			1	0	0	0
Morphine	2833	57-27-2			1	1	0	0
Murethane Insulation	2821	9009-54-5			1	0	0	1
Muriatic Acid	2819	7647-01-0			6	2	0	3
N-Butane	2869	106-97-8			1	0	0	0
N-Butyl Alcohol	2869	71-36-3			1	1	1	1
N-Octyl-Mercaptan	2869	111-88-6			2	0	0	0
N-Propanol	2869	71-23-8			1	0	0	0
Nalco 1370	2800				1	0	0	0
Nalco 225	2800				1	0	0	0
Nalco 324	2800				1	1	0	0
Naphtha	2865	8007-45-2	8030-30-6	8052-41-3	16	3	0	3
Naphtha Asphalt	2865				1	1	1	0
Naphtha Spirits	2865	8007-45-2	8030-30-6	8052-41-3	1	0	0	0
Naphtha/Xylene/VMP	2865	106-42-3	1330-20-7	8007-45-2	1	0	0	0
Naphthalene	2865	91-20-3	1146-65-2		4	0	0	0
Natural Gas	2911	8006-14-2	64741-84-6		4	0	0	2
Nickel Nitrate	2819	13138-45-9			1	0	0	0
Nickel Plating Solution	2819				2	0	0	0
Nickel Sulfate	2819	7786-81-4			1	0	0	1
Nickel/Molybdenum/H2O Solution	3300	7440-02-0	7439-98-7	7732-18-5	1	0	0	0

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SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Nitric Acid	2873	7697-37-2			43	7	1	9
Nitric Oxide	2819	10102-43-9			23	0	0	0
Nitric/Chromic Acids	2819	7697-37-2	1333-82-0	7738-94-5	1	0	0	0
Nitric/Sulfuric Acids	2819	7697-37-2	7664-93-9		1	0	0	0
Nitrobenzene	2865	98-95-3			2	0	0	0
Nitrocellulose	2821	9004-70-0			2	2	1	0
Nitrocellulose Film	2821	9004-70-0			1	0	0	0
Nitrochlorobenzene	2865	25167-93-5			1	0	0	1
Nitrodiphenylamine	2865	119-75-5	34344-88-2		1	0	0	0
Nitrogen	2813	7727-37-9			8	1	0	1
Nitrogen Fertilizer	2873				38	2	0	0
Nitrogen Fertilizer/Lasso	2873	15972-60-8			2	0	0	0
Nitrogen Oxide	2819	10024-97-2	10102-44-0	11104-93-1	1	0	0	0
Nitrogen/Atrazine	2879	1912-24-9			2	0	0	1
Nitrogen/Xylene	2865	7727-37-9	1330-20-7		1	0	0	0
Nitrous Oxide	2813	10024-97-2			9	4	0	0
O-Xylene	2865	95-47-6			1	0	0	0
Octyl Alcohol	2869	104-76-7	111-87-5		2	1	0	1
Oil	2911				10	4	1	2
Organic Phosphate	2869				1	0	0	0
Ortho-Chlorophenol	2865	95-57-8			1	0	0	0
Ortho-Nitrochlorobenzene	2865	88-73-3			1	1	0	1
Ortho-Phosphoric Acid	2874	7664-38-2			1	0	0	0
Orthoronitro Toluene	2865	88-72-2			1	0	0	0
Oxide Catalyst	2819				2	0	0	0
Oxidizers	2890				2	2	0	0
Oxygen	2813	7782-44-7			3	1	1	0
Paint	2851				10	2	0	0
Paint Hazardous Products	2851				1	0	0	1
Paint Resin	2851				1	0	0	0
Paint Thinner	2851				2	0	0	0
Para-Cresol	2865	106-44-5			1	0	0	1
Paracymene	2865	99-87-6			1	0	0	0
Paraformaldehyde	2869	110-88-3	9002-81-7	30525-89-4	1	0	0	0
Parahydromercluribenzate	2865				1	0	0	0
Paraquat	2879	1910-42-5	4685-14-7		5	3	0	4

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Parathion	2879	56-38-2			4	2	0	2
Pentachlorophenol	2865	87-86-5			6	2	0	1
Pentane	2869	109-66-0			4	1	0	1
Perchloric Acid	2819	7601-90-3			1	1	0	0
Peroxide	2819				3	1	0	0
Pesticide	2879				13	4	0	4
Pesticides	2879				1	1	0	1
Petroleum	2911	8002-05-9			1	0	0	0
Petroleum Distillate	2911	8002-05-9			2	0	0	0
Petroleum Ether	2911	8030-30-6	8032-32-4		1	0	0	0
Petroleum Fluids	2911				1	0	0	1
Petroleum Gas	2911				1	0	0	0
Petroleum Products	2911				5	1	0	2
Petroleum Refining Slurry	2911				1	0	0	0
Phenol	2865	108-95-2			11	1	0	2
Phenol Acetone	2865	35238-34-7	103-79-7		1	0	0	0
Phenol Formaldehyde	2865	9003-35-4			5	0	0	0
Phenol Mercury Acetate	2865				1	1	0	0
Phenolic Resin	2821				2	0	0	0
Phenyl Mercuric Acetate	2874	62-38-4			1	0	0	0
Phenyldichloroarsine	2865	696-28-6			1	0	0	0
Phosgene	2869	75-44-5			14	6	2	4
Phosphate Base Fertilizer	2874				1	0	0	0
Phosphate/Phostoxin	2819	14265-44-2	20859-73-8		1	0	0	0
Phosphine	2819	7803-51-2			2	1	0	1
Phosphoric Acid	2874	7664-38-2	14265-44-2		27	4	0	4
Phosphoric Trichloride	2819	10025-87-3			1	1	0	1
Phosphorus	2819	7723-14-0			7	1	1	1
Phosphorus Chloridate Othedate	2819				1	0	0	0
Phosphorus Oxychloride	2819	10025-87-3			3	2	0	1
Phosphorus Pentasulfide	2819	1314-80-3			3	0	0	2
Phosphorus Trichlorate	2819				1	0	0	0
Phosphorus Trichloride	2819	7719-12-2			1	0	0	0
Phostoxin	2819	20859-73-8			1	0	0	0
Phthalic Anhydride	2865	85-44-9			5	3	0	1
Pitch	2865	8007-45-2	61789-60-4	65996-93-2	2	0	0	0

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APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Plastic	2821				2	0	0	1
Plastic Resin	2821				1	0	0	0
Plating Solution	....				1	0	0	0
Poison	....				1	0	0	1
Polychlorinated Biphenyls	2821	2051-24-3	11096-82-5	11097-69-1	189	14	0	4
Polyester	2821				1	0	0	0
Polyester Resin	2821				3	0	0	0
Polyester Styrene	2821	100-42-5			1	0	0	0
Polyether	2821				2	0	0	0
Polyether Polyol	2821				1	0	0	0
Polyethylene	2821	9002-88-4			6	2	1	0
Polyglycol Ether	2821				1	0	0	0
Polylvinyl Chloride	2821	9002-86-2			1	0	0	0
Polymeric Diphenol	2821				1	1	0	0
Polyoxylene Polyol	2821				1	0	0	0
Polypropylene	2821	9003-07-0			10	2	1	1
Polystyrene	2821	9003-53-6			2	1	0	0
Polystyrene Foam	2821	9003-53-6			1	0	0	0
Polyurethane	2821	68400-67-9			1	0	0	0
Polyurethane Binder	2821				1	0	1	0
Polyurethane Foam	2821	9009-54-5			1	0	0	0
Polyvinyl Acetate Emulsion	2821	9003-20-7			1	0	0	0
Polyvinyl Chloride	2821	9002-86-2			4	1	1	2
Potash	2812	584-08-7	12136-45-7		4	0	0	0
Potassium Carbonate	2812	584-08-7			2	0	0	0
Potassium Chloride	2819	7447-40-7	24359-76-0		1	0	0	0
Potassium Chromate	2819	7789-00-6			1	0	0	0
Potassium Cyanide	2819	151-50-8			1	0	0	0
Potassium Ferricyanide	2819	13746-66-2			2	2	0	2
Potassium Ferrocyanide	2819	13746-66-2			2	2	0	2
Potassium Hydroxide	2812	1310-58-3			8	1	0	1
Potassium Nitrate	2819	7757-79-1			2	0	0	0
Potassium Permanganate	2819	7722-64-7			3	0	0	1
Printing Chemicals	2893				1	0	0	0
Printing Ink	2893				1	0	0	0
Propane	2911	74-98-6			15	5	1	5

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Propargite	----	2312-35-8			1	0	0	0
Propargyl Alcohol	2869	107-19-7			1	0	0	0
Propionaldehyde	2869	123-38-6			1	0	0	0
Propyl Alcohol	2869	71-23-8			1	0	0	0
Propyl Mercaptan	2869	107-03-9			1	1	0	0
Propylene	2869	115-07-1			14	1	1	2
Propylene Alcohol	2869	107-18-6			1	0	0	0
Propylene Dichloride	2869	78-87-5	536-54-2	26638-19-7	1	1	0	1
Propylene Glycol	2869	57-55-6			4	0	0	1
Propylene Mercaptan	2869				1	0	0	0
Propylene Oxide	2869	75-56-9			7	1	0	1
Propylene Tetramer	2869	6842-15-5			1	0	0	0
Propylene/Hexcone/Propane	2869	115-07-1	74-98-6		1	0	0	0
Pulp Mill Waste	2611				1	0	0	0
Pyrethrim	2879	8003-34-7	121-29-9		1	0	0	1
Pyrethrin	2879	8003-34-7	121-29-9		1	1	0	1
Pyridine	2865	110-86-1			2	0	0	2
Quicklime	2812	1305-78-8			1	0	0	0
Refinery Gases	2911	68607-11-4			1	0	0	0
Refinery Oil	2911				1	0	0	0
Refining Hydrocarbons	2911				1	0	0	0
Refrigerant 22	2899	75-45-6			1	0	0	0
Resin	2821				7	1	0	0
Rhoplex Resin	2821				1	0	0	0
Rhoplex-TR-470	2821				1	0	0	0
Rich Oil	2911				1	0	0	0
Safety Klean 105	2860				1	0	0	0
Salicylic Acid	2865	69-72-7			1	0	0	0
Salt Water	----				1	0	0	0
Satan/Aatrex	2879	1912-24-9			1	0	0	0
Sevin	2879	63-25-2			1	0	0	0
Silane	2819	7803-62-5			3	0	0	0
Silicate of Soda	2819				1	1	0	0
Silicon Tetrachloride	2819	10026-04-7			1	1	0	1
Sludge	----				2	0	0	0
Sodium	3300	7440-23-5			1	1	0	0

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APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Sodium Bichromate	2819	10588-01-9			1	0	0	0
Sodium Bisulfate	2819	7681-38-1			1	0	0	0
Sodium Bisulfite	2819	7631-90-5			3	0	0	0
Sodium Bromate	2819	7789-38-0			1	0	0	0
Sodium Carbonate	2812	144-55-8	497-19-8		3	0	0	1
Sodium Chlorate	2819	7775-09-9			2	0	0	0
Sodium Chlorite	2819	7758-19-2			2	0	1	1
Sodium Chromate	2819	7775-11-3	10588-01-9		3	0	0	0
Sodium Cyanide	2819	143-33-9	1934-75-4		3	0	0	1
Sodium Formate	2819	141-53-7			1	0	0	1
Sodium Hydrochloric Acid	2819				1	1	0	1
Sodium Hydrosulfate	2819	7681-38-1			4	1	0	1
Sodium Hydrosulfide	2819	7631-90-5	16721-80-5		2	1	0	1
Sodium Hydrosulfite	2819	7631-90-5	7775-14-6		3	1	0	1
Sodium Hydroxide	2812	1310-73-2			50	9	1	5
Sodium Hydroxide/Chromium	2812	1310-73-2	7440-47-3		1	0	0	0
Sodium Hydroxide/Tar	2812	1310-73-2	8007-45-2		1	0	0	0
Sodium Hypochlorate	2819	7681-52-9			4	0	0	0
Sodium Hypochlorite	2842	7681-52-9			6	2	0	2
Sodium Nitrate	2819	7631-99-4			5	2	1	1
Sodium Nitrite	2819	7632-00-0			1	0	0	0
Sodium Permanganate	2819	10101-50-5			1	0	0	0
Sodium Sulfhydrate	2819	16721-80-5			1	1	1	1
Soduim Hydroxide	2812	1310-73-2			1	0	0	0
Solvent	2860				37	7	2	7
Solvents/Corrosives	2860				1	1	0	0
Specialty Oils	2899				1	1	1	0
Styrene	2865	100-42-5			37	6	0	9
Styrene Tar	2865				1	0	0	0
Styrofoam	2821	9003-53-6			1	0	0	1
Sulfamic Acid	2819	5329-14-6			2	0	0	0
Sulfite	2819	14265-45-3			2	0	0	0
Sulfur	3300	7704-34-9			23	1	1	2
Sulfur Chloride	2819	10025-67-9	10545-99-0	12771-08-3	40	0	0	0
Sulfur Dioxide	2819	7746-09-5			47	1	0	0
Sulfur Monochloride	2819	10025-67-9	12771-08-3		3	0	0	1

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SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Sulfur Trioxide	2819	7446-11-9			13	1	0	0
Sulfur Vanadium Pentoxide	2819				1	0	0	0
Sulfuric Acid	2819	7664-93-9			130	21	2	14
Sulfuric Dioxide	2819	7446-09-5			1	1	0	1
Sulfuric/Nitric Acid	2819	7664-93-9	7697-37-2		1	0	0	0
Surfactant	2843				1	0	0	0
Sutan	2879	2008-41-5			1	0	0	0
Sutazine	2879	8070-81-3			1	0	0	0
Synthetic Resin Emulsion	2821				1	0	0	0
Synthetic Rubber	2822				1	0	0	0
T-Butyl Mercaptan	2869	75-66-1			1	0	0	0
Tallow/Alcohol/Hydrogen	2840				1	0	0	0
Terephthalic Acid	2865	100-21-0			1	0	0	0
Tertiary ButylPeroxyPhthalate	2865	15042-77-0			1	0	0	0
Tertiary Butylperbenzoate	2865	614-45-9			1	0	0	0
Tetrachloroethane	2869	79-34-5	25322-20-7		3	0	0	0
Tetrachloroethylene	2869	127-18-4			15	2	0	1
Tetraethyl Lead	2869	78-00-2			4	1	0	1
Tetrahydrocarbon	2869				2	0	0	0
Tetrahydrofuran	2869	109-99-9			4	1	0	0
Tetrapotassium Phosphate	2819				1	0	0	0
Thiabendazole	2865	148-79-8			1	0	0	0
Thionyl Chloride	2819	7719-09-7			1	1	0	0
Thiophene	2865	110-02-1			2	2	0	0
Thiram	2879	137-26-8			1	1	0	0
Tin Oxide	2819	1332-29-2	12169-15-2	12298-99-6	1	0	0	0
Tin Tetrachloride	2819	7646-78-8			1	0	0	0
Titanium	3300	7440-32-6			3	0	0	0
Titanium Dioxide	2819	1317-70-0	1317-80-2	13463-67-7	4	0	0	0
Titanium Tetrachloride	2819	7550-45-0			10	0	0	1
Toled Number 249	----				1	0	0	0
Toluene	2865	108-88-3			39	7	3	3
Toluene Diisocyanate	2865	584-84-9	26471-62-5		11	4	0	5
Toluene/Cyanoethyl Caprolactam	2869	108-88-3	7336-15-4		1	0	0	0
Toxaphene	2879	8001-35-2			2	0	0	1
Toxaphine	2879	8001-35-2			1	0	0	1

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SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Toxic Flammable Liquids	----				1	0	0	0
Treflan	2879	1582-09-8			1	0	0	0
Treflan/Sencor	2879	1582-09-8	21087-64-9		1	0	0	0
Triazole	2865	37306-44-8			1	1	0	0
Trichloride	----	18434-33-8			1	0	0	0
Trichloroethane	2869	71-55-6	79-00-5	25323-89-1	7	2	1	0
Trichloroethylene	2869	79-01-6			7	1	0	1
Trichloroethylene-Triazine	2869	79-01-6	101-05-3	12654-97-6	2	0	0	0
Trichlorophenylsilane	2865	98-13-5			2	0	0	0
Triethyl Butane	2869				1	0	0	0
Triethylamine	2869	121-44-8			1	0	0	0
Triethylene Glycol	2869	112-27-6			1	0	0	0
Triethylene Glycol/ Ethanol	2869	112-27-6	64-17-5		1	0	0	0
Trifluoromethane	2869	75-46-7			1	0	0	0
Trifluralin	2874	1582-09-8			1	1	0	0
Trimethylamine	2869	75-50-3			2	1	0	0
Turdon (Amdon 101)	2879	1918-02-1			2	0	0	0
Unknown	----				75	23	2	11
Uranium	2819	7440-61-1			2	0	0	0
Uranium Hexafluoride	2819	7783-81-5			4	1	0	0
Uranium Oxide	2819	1344-57-6	11113-93-2	19525-15-6	4	0	0	0
Uranium Tetrafluoride	2819	10049-14-6			2	0	0	0
Urea	2873	57-13-6			2	0	1	0
Urea Ammonia Fertilizer	2873				1	0	0	0
Urea Ammonium Nitrate	2873				5	0	0	0
Urea Formaldehyde	2821	9011-05-6			2	0	0	0
Urethane Resin	2821	9009-54-5			1	1	0	1
VOC Gas Mixture	2860				1	0	0	0
Vacuum Distillate	2911				1	1	1	0
Vanadium Pentoxide	2819	1314-62-1			2	0	0	0
Vapam	2879	137-42-8	6734-80-1		1	0	0	0
Vinyl Acetate	2869	108-05-4			21	1	0	3
Vinyl Alcohol	2869	557-75-5			1	0	0	0
Vinyl Chloride	2869	75-01-4			69	5	0	10
Vinyl Chloride Dichlor	2869				1	0	0	0
Vinyl Toluene	2821	25013-15-4			1	0	0	1

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Vinyl Toluene/Alkyd/Resin	2821	25013-15-4			1	0	0	0
Vinylidene	2869	2143-69-3			1	0	0	0
Vinylidene Chloride	2869	75-35-4			9	0	0	0
Volatile Organic Compounds	....				3	0	0	0
WD-40 Oil	2899	83764-86-7			1	0	0	1
Waste Chemicals	....				1	0	0	1
Waste Water	....				1	0	0	1
Weedon	2879	2545-59-7			1	0	0	0
Xylene	2865	106-42-3	1330-20-7		2	0	0	0
Xylenol	2865	1300-71-6			15	0	0	4
Zinc	3300	7440-66-6			1	0	0	0
Zinc Cyanide	2819	557-21-1			3	1	1	0
Zinc Dust	3300	7440-66-6			1	1	0	0
Zinc Oxide	2819	1314-13-2	20431-17-8		1	1	0	0
Zinc Phosphate	2819	7779-90-0	13566-15-9	13847-22-8	2	0	0	0
Zinc Sulfate	2819	7733-02-0	38899-67-1		1	0	0	0
Zirconium	3300	7440-67-7			1	0	0	0
Butene	?				1	0	0	0
Calcium Cilicide	?				1	0	0	0
Carbolic Acid	?				1	0	0	1
Caustic Acid	?				2	1	1	1
Chloroformates	?				1	0	0	0
Chlorosulfuric Acid	?				1	0	0	0
Chlorotyrisos	?				1	0	0	0
Chlorpyrifos	?				1	0	0	0
Chromatic Acid	?				1	0	0	0
Cypernethren	?				1	0	0	0
Diesel Fuel	?				1	1	0	1
Diethyl Methyl Phosphorothidat	?				1	1	0	1
Dimethyl terephthalate	?				1	0	0	0
Dimethylcyclohexylane	?				1	0	0	0
Glycerine Thermox	?				1	0	0	0
Hydrozene	?				1	0	0	0
Isopropylamine Glysophate	?				1	0	0	0
Mono-al Phosphatesol	?				1	0	0	0
Organophosphates	?				1	1	0	1

SUMMARY OF SUBSTANCES
APPEARING IN HAZARDOUS EVENTS DATABASE

SUBSTANCE	4 Digit SIC	1st CAS #	2nd CAS #	3rd CAS #	EVENTS: TOTAL	INJURY	FATAL	EVACUATION
Organosal Ineesther	?				1	0	0	0
Orthene	?				1	0	0	0
Permethane	?				1	0	0	0
Phenol-Melamine Formica Resin	?				1	0	0	0
Phosphate Acid	?				1	0	0	0
Phosphons	?				2	0	0	0
Proponic Acid	?				1	0	0	0
Propylene Oxide Styrene	?				1	0	0	0
Pydrin	?				1	0	0	0
Ridoline	?				1	1	0	1
Solvent Isoparafin	?				1	0	0	0
Sulfonic Acid	?				1	0	0	0
Thisodian	?				1	1	0	0
Trichlorotriazinitrion	?				1	0	0	0

APPENDIX D

DATABASE SUMMARY FOR ALL EVENTS

ENCYCLOPEDIA OF DATA
(All Records)

	No. of Records	% of Total
SUBSTANCE STATE		
Solid	179	2.58
Liquid	5411	78.10
Gas	1021	14.74
Unknown	563	8.13
Solid Waste	48	0.69
Liquid Waste	259	3.74
Gas Waste	54	0.78
Unknown Waste	5	0.07
Total Solid	227	3.28
Total Liquid	5670	81.84
Total Gas	1075	15.52
PROPERTY DAMAGE		
Yes	476	6.87
No	1891	27.30
Unknown	4561	65.83
ENVIRONMENTAL DAMAGE		
Yes	181	2.61
No	669	9.66
Unknown	6078	87.73
AIR MEDIA AFFECTED		
Yes	2052	29.62
No	363	5.24
Unknown	4513	65.14
WATER MEDIA AFFECTED		
Yes	1042	15.04
No	2828	40.82
Unknown	3058	44.14
LAND MEDIA AFFECTED		
Yes	3694	53.32
No	874	12.62
Unknown	2360	34.06
HIGH TEMPERATURE		
Yes	114	2.20
No	835	16.12
Unknown	4230	81.68
HIGH PRESSURE		
Yes	179	3.46
No	814	15.72
Unknown	4186	80.83

ENCYCLOPEDIA OF DATA
(All Records)

	No. of Records	% of Total
EVACUATION?		
Yes	341	4.92
No	1173	16.93
Unknown	5414	78.15
DEATHS?		
Yes	64	0.92
No	6297	90.89
Unknown	567	8.18
INJURIES?		
Yes	459	6.63
No	5628	81.24
Unknown	841	12.14
IN-PLANT	5179	74.75
IN-TRANSIT	1749	25.25
IN-PLANT LOCATION		
Process Vessel	732	14.13
Storage Vessel	1071	20.68
Valves/Pipes	1006	19.42
Other	1442	27.84
Unknown	928	17.92
IN-PLANT CAUSE		
Equipment Failure	2244	43.33
Operator Error	592	11.43
Upset Conditions	159	3.07
Fire	164	3.17
Other	907	17.51
Unknown	1113	21.49
OPERATIONAL CONFIGURATION		
Loading/Unloading	782	15.10
Steady State	1585	30.60
Start-Up	54	1.04
Shut Down	28	0.54
Maintenance	121	2.34
Other	124	2.39
Unknown	2485	47.98
IN-TRANSIT MODE		
Truck	953	54.49
Rail	632	36.13
Barge	66	3.77
Pipeline	55	3.14
Other	43	2.46

ENCYCLOPEDIA OF DATA
(All Records)

	No. of Records	% of Total
IN-TRANSIT CAUSE		
Leak	671	38.36
Collision	355	20.30
Other	581	33.22
Unknown	142	8.12
END EFFECTS		
Spill	4965	71.67
Vapor Release	1784	25.75
Fire	347	5.01
Explosion	247	3.57
Other	42	0.61
PROCESS VESSEL AND:		
Equipment Failure	285	38.93
Operator Error	78	10.66
Upset Conditions	97	13.25
Fire	16	2.19
Other	148	20.22
Unknown	108	14.75
STORAGE VESSEL AND:		
Equipment Failure	336	31.37
Operator Error	247	23.06
Upset Conditions	19	1.77
Fire	20	1.87
Other	207	19.33
Unknown	242	22.60
VALVES/PIPES AND:		
Equipment Failure	659	65.51
Operator Error	124	12.33
Upset Conditions	8	0.80
Fire	1	0.10
Other	154	15.31
Unknown	60	5.96
OTHER LOCATION AND:		
Equipment Failure	620	43.00
Operator Error	91	6.31
Upset Conditions	23	1.60
Fire	55	3.81
Other	304	21.08
Unknown	349	24.20

ENCYCLOPEDIA OF DATA
(All Records)

	No. of Records	% of Total
PROCESS VESSEL AND:		
Loading/Unloading	21	2.87
Steady State	292	39.89
Start-Up	27	3.69
Shut Down	10	1.37
Maintenance	12	1.64
Other	5	0.68
Unknown	365	49.86
STORAGE VESSEL AND:		
Loading/Unloading	410	38.28
Steady State	241	22.50
Start-Up	1	0.09
Shut Down	3	0.28
Maintenance	9	0.84
Other	53	4.95
Unknown	354	33.05
VALVES/PIPES AND:		
Loading/Unloading	203	20.18
Steady State	282	28.03
Start-Up	16	1.59
Shut Down	2	0.20
Maintenance	56	5.57
Other	12	1.19
Unknown	435	43.24
OTHER LOCATIONS AND:		
Loading/Unloading	86	5.96
Steady State	734	50.90
Start-Up	7	0.49
Shut Down	7	0.49
Maintenance	39	2.70
Other	43	2.98
Unknown	526	36.48

ENCYCLOPEDIA OF DATA
(All Records)

	No. of Records	% of Total
SOURCES		
CAL	141	
NJE	116	
NRC	5032	
OHE	263	
RG7	513	
TXA	442	
CHP	67	
MMA	64	
NTP	65	
UPI	139	
LAT	28	
CHT	12	
NYT	46	
TOTAL RECORDS	6928	

TOP TWENTY SUBSTANCES BY NUMBER OF RECORDS

SUBSTANCE	NUMBER OF RECORDS TOT	% OF TOT	*	QUANTITY IN POUNDS TOT	% OF TOT	*	AVG QUANT PER RECORD	*
			*			*		*
PCBs	1590	22.950	*	1,204.448	0.288	*	758	*
SULFURIC ACID	453	6.539	*	3,987,566	0.952	*	8,803	*
ANHYDROUS AMMONIA	258	3.724	*	2.756,031	0.658	*	10,682	*
CHLORINE	245	3.536	*	80,897	0.019	*	330	*
HYDROCHLORIC ACID	213	3.074	*	3,046,381	0.728	*	14,302	*
SODIUM HYDROXIDE	181	2.613	*	12,058,177	2.880	*	66,620	*
METHYL ALCOHOL	115	1.660	*	2,883,823	0.689	*	25,077	*
METHYL CHLORIDE	98	1.415	*	70,214	0.017	*	716	*
TOLUENE	95	1.371	*	4,820.857	1.152	*	50,746	*
NITRIC ACID	115	1.660	*	3,939,974	0.941	*	34,261	*
VINYL CHLORIDE	79	1.140	*	200,812	0.048	*	2,542	*
PHOSPHORIC ACID	72	1.039	*	530,680	0.127	*	7,371	*
FERTILIZER	75	1.083	*	959,284	0.229	*	12,790	*
BENZENE	65	0.938	*	677,450	0.162	*	10,422	*
SOLVENT	74	1.068	*	682,389	0.163	*	9,221	*
STYRENE	62	0.895	*	251,130	0.060	*	4,050	*
HYDROGEN SULFIDE	58	0.837	*	128,488	0.031	*	2,215	*
ETHYLENE DICHLORIDE	63	0.909	*	676,345	0.162	*	10,736	*
TETRACHLOROETHYLENE	50	0.722	*	770,858	0.184	*	15,417	*
SULFUR DIOXIDE	46	0.664	*	898,668	0.215	*	19,536	*
ALL OTHERS	2921	42.162	*	378,033,825	90.297	*	129,419	*
TOTAL	6928	100.000	*	418,658,297	100.000	*	60,430	*

QUANTITY RANGES

RANGE NUMBER	RANGE (LBS)
1	1 - 10
2	11 - 100
3	101 - 1,000
4	1K - 10K
5	10K - 25K
6	25K - 50K
7	50K - 100K
8	100K +

NUMBER OF RECORDS - ALL RECORDS

	TOTAL		PROCESS VESSEL		STORAGE VESSEL		VALVES/PIPES		OTHER	
RANGE	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT
1	653	12.541	52	9.830	20	2.519	56	6.335	286	23.139
2	1291	24.794	118	22.306	87	10.957	168	19.005	453	36.650
3	1278	24.544	152	28.733	201	25.315	199	22.511	287	23.220
4	1142	21.932	115	21.739	291	36.650	286	32.353	122	9.871
5	318	6.107	43	8.129	47	5.919	50	5.656	31	2.508
6	283	5.435	18	3.403	61	7.683	89	10.068	44	3.560
7	116	2.228	11	2.079	34	4.282	17	1.923	1	0.081
8	126	2.420	20	3.781	53	6.675	19	2.149	12	0.971
TOT	5207	100.000	529	100.000	794	100.000	884	100.000	1236	100.000

	EQUIPMENT FAILURE		OPERATOR ERROR		UPSET CONDITION		FIRE		OTHER	
RANGE	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT
1	322	16.312	8	1.544	5	5.814	23	28.750	99	13.618
2	603	30.547	70	13.514	15	17.442	32	40.000	202	27.785
3	424	21.479	114	22.008	31	36.047	8	10.000	169	23.246
4	382	19.352	155	29.923	25	29.070	13	16.250	166	22.834
5	76	3.850	56	10.811	5	5.814	2	2.500	25	3.439
6	80	4.053	89	17.181	2	2.326	0	0.000	38	5.227
7	37	1.874	11	2.124	0	0.000	2	2.500	2	0.275
8	50	2.533	15	2.896	3	3.488	0	0.000	26	3.576
TOT	1974	100.000	518	100.000	86	100.000	80	100.000	727	100.000

	TRUCK		RAIL		PIPELINE		BARGE		OTHER	
RANGE	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT
1	69	9.225	48	18.605	0	0.000	0	0.000	2	7.692
2	91	12.166	40	15.504	2	6.250	10	34.483	11	42.308
3	251	33.556	67	25.969	4	12.500	12	41.379	6	23.077
4	190	25.401	31	12.016	12	37.500	1	3.448	7	26.923
5	85	11.364	24	9.302	11	34.375	2	6.897	0	0.000
6	44	5.882	5	1.938	0	0.000	1	3.448	0	0.000
7	11	1.471	34	13.178	0	0.000	1	3.448	0	0.000
8	7	0.936	9	3.488	3	-9.375	2	6.897	0	0.000
TOT	748	100.000	258	100.000	32	100.000	29	100.000	26	100.000

QUANTITY IN POUNDS - ALL RECORDS

RANGE	TOTAL		PROCESS VESSEL		STORAGE VESSEL		VALVES/PIPES		OTHER		UNKNOWN	
	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	3,823	0.001	430	0.004	164	.000	247	0.003	1,744	0.006	757	0.036
2	50,145	0.012	5,376	0.046	5,053	0.002	10,442	0.115	12,226	0.044	9,614	0.451
3	534,411	0.128	53,718	0.458	84,953	0.026	104,330	1.154	113,867	0.414	39,223	1.839
4	4,138,908	0.989	477,087	4.063	1,100,154	0.339	985,494	10.897	385,053	1.401	279,519	13.109
5	5,306,984	1.268	662,480	5.642	899,254	0.277	850,721	9.407	462,025	1.681	449,578	21.084
6	10,315,186	2.464	798,980	6.805	2,220,100	0.684	3,048,810	33.712	1,585,030	5.765	761,540	35.715
7	8,294,668	1.981	652,500	5.557	2,337,250	0.720	1,159,730	12.824	74,888	0.272	472,550	22.162
8	390,014,172	93.158	9,090,500	77.425	317,916,250	97.952	2,884,000	31.889	24,858,420	90.416	119,502	5.604
TOTAL	418,658,297	100.000	11,741,071	100.000	324,563,178	100.000	9,043,774	100.000	27,493,253	100.000	2,132,283	100.000

RANGE	EQUIPMENT FAILURE		OPERATOR ERROR		UPSET CONDITION		FIRE		OTHER		UNKNOWN	
	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	2,135	0.007	41	.000	34	0.003	183	0.064	523	.000	426	0.001
2	19,762	0.062	4,106	0.040	746	0.075	865	0.301	7,623	0.003	9,609	0.033
3	199,157	0.624	46,680	0.450	15,471	1.560	4,051	1.409	59,813	0.020	70,919	0.247
4	1,387,629	4.348	537,261	5.183	64,138	6.468	80,896	28.147	588,140	0.194	569,243	1.979
5	1,372,138	4.299	957,000	9.232	70,658	7.126	31,913	11.104	379,125	0.125	513,224	1.784
6	2,853,780	8.941	3,306,810	31.899	65,000	6.555	0	0.000	1,383,850	0.457	805,020	2.798
7	2,585,980	8.102	678,750	6.548	0	0.000	169,500	58.975	144,750	0.048	1,117,938	3.886
8	23,496,000	73.617	4,835,750	46.648	775,500	78.211	0	0.000	300,078,500	99.153	25,682,922	89.272
TOTAL	31,916,581	100.000	10,366,398	100.000	991,547	100.000	287,408	100.000	302,642,324	100.000	28,769,301	100.000

RANGE	TRUCK		RAIL		PIPELINE		BARGE		OTHER	
	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	261	0.003	202	0.003	0	0.000	0	0.000	18	0.055
2	4,290	0.056	1,899	0.027	175	0.001	750	0.022	320	0.972
3	92,908	1.223	36,024	0.513	3,375	0.013	2,450	0.073	3,563	10.823
4	767,706	10.110	75,795	1.079	31,580	0.123	7,500	0.224	29,020	88.150
5	1,389,648	18.300	345,000	4.912	200,278	0.780	48,000	1.436	0	0.000
6	1,586,183	20.888	219,543	3.126	0	0.000	95,000	2.841	0	0.000
7	680,250	8.958	2,842,500	40.469	0	0.000	75,000	2.243	0	0.000
8	3,072,500	40.461	3,503,000	49.872	25,455,000	99.084	3,115,000	93.160	0	0.000
TOTAL	7,593,746	100.000	7,023,963	100.000	25,690,408	100.000	3,343,700	100.000	32,921	100.000

COMPARISON TO BHOPAL
(All Records)

	No. of Records	% of Total
Quantity released) 80,000 pounds	157	2.266
Storage Vessel and Operator Error	280	4.042
Storage Vessel and Vapor Release	173	2.497
Vapor Release and Operator Error	106	1.530
Storage Vessel, Operator Error, and Vapor Release	44	0.635
Total Records	6928	

APPENDIX E

DATABASE SUMMARY FOR DEATH/INJURY EVENTS

ENCYCLOPEDIA OF DATA
(Death and Injury Records)

-DEATH/INJURY RECORDS-

	No. of Records	% of Total
SUBSTANCE STATE		
Solid	27	5.77
Liquid	324	69.23
Gas	109	23.29
Unknown	82	17.52
Solid Waste	2	0.43
Liquid Waste	13	2.78
Gas Waste	2	0.43
Unknown Waste	2	0.43
Total Solid	29	6.20
Total Liquid	337	72.01
Total Gas	111	23.72
PROPERTY DAMAGE		
Yes	166	35.47
No	87	18.59
Unknown	215	45.94
ENVIRONMENTAL DAMAGE		
Yes	45	9.62
No	52	11.11
Unknown	371	79.27
AIR MEDIA AFFECTED		
Yes	312	66.67
No	17	3.63
Unknown	139	29.70
WATER MEDIA AFFECTED		
Yes	51	10.90
No	155	33.12
Unknown	262	55.98
LAND MEDIA AFFECTED		
Yes	156	33.33
No	75	16.03
Unknown	237	50.64
HIGH TEMPERATURE		
Yes	22	7.24
No	37	12.17
Unknown	245	80.59
HIGH PRESSURE		
Yes	26	8.55
No	34	11.18
Unknown	244	80.26

-DEATH/INJURY RECORDS-

	No. of Records	% of Total
EVACUATION?		
Yes	155	33.12
No	74	15.81
Unknown	239	51.07
DEATHS?		
Yes	64	13.68
No	377	80.56
Unknown	27	5.77
INJURIES?		
Yes	459	98.08
No	5	1.07
Unknown	4	0.85
IN-PLANT	304	64.96
IN-TRANSIT	164	35.04
IN-PLANT LOCATION		
Process Vessel	39	12.83
Storage Vessel	110	36.18
Valves/Pipes	51	16.78
Other	46	15.13
Unknown	58	19.08
IN-PLANT CAUSE		
Equipment Failure	83	27.30
Operator Error	39	12.83
Upset Conditions	14	4.61
Fire	24	7.89
Other	22	7.24
Unknown	122	40.13
OPERATIONAL CONFIGURATION		
Loading/Unloading	55	18.09
Steady State	40	13.16
Start-Up	5	1.64
Shut Down	5	1.64
Maintenance	13	4.28
Other	21	6.91
Unknown	165	54.28
IN-TRANSIT MODE		
Truck	113	68.90
Rail	32	19.51
Barge	8	4.88
Pipeline	3	1.83
Other	8	4.88

ENCYCLOPEDIA OF DATA
(Death and Injury Records)

-DEATH/INJURY RECORDS-

	No. of Records	% of Total
IN-TRANSIT CAUSE		
Leak	55	33.54
Collision	71	43.29
Other	26	15.85
Unknown	12	7.32
END EFFECTS		
Spill	254	54.27
Vapor Release	246	52.56
Fire	126	26.92
Explosion	109	23.29
Other	4	0.85
PROCESS VESSEL AND:		
Equipment Failure	14	35.90
Operator Error	6	15.38
Upset Conditions	5	12.82
Fire	0	0.00
Other	2	5.13
Unknown	12	30.77
STORAGE VESSEL AND:		
Equipment Failure	25	22.73
Operator Error	20	18.18
Upset Conditions	6	5.45
Fire	7	6.36
Other	8	7.27
Unknown	44	40.00
-VALVES/PIPES AND:		
Equipment Failure	35	68.63
Operator Error	6	11.76
Upset Conditions	1	1.96
Fire	1	1.96
Other	3	5.88
Unknown	5	9.80
OTHER LOCATION AND:		
Equipment Failure	8	17.39
Operator Error	6	13.04
Upset Conditions	1	2.17
Fire	1	2.17
Other	7	15.22
Unknown	23	50.00

-DEATH/INJURY RECORDS-

	No. of Records	% of Total
PROCESS VESSEL AND:		
Loading/Unloading	1	2.56
Steady State	10	25.64
Start-Up	3	7.69
Shut Down	0	0.00
Maintenance	4	10.26
Other	3	7.69
Unknown	18	46.15
STORAGE VESSEL AND:		
Loading/Unloading	37	33.64
Steady State	7	6.36
Start-Up	0	0.00
Shut Down	1	0.91
Maintenance	5	4.55
Other	8	7.27
Unknown	52	47.27
VALVES/PIPES AND:		
Loading/Unloading	8	15.69
Steady State	12	23.53
Start-Up	1	1.96
Shut Down	1	1.96
Maintenance	1	1.96
Other	0	0.00
Unknown	28	54.90
OTHER LOCATIONS AND:		
Loading/Unloading	5	10.87
Steady State	11	23.91
Start-Up	1	2.17
Shut Down	3	6.52
Maintenance	1	2.17
Other	10	21.74
Unknown	15	32.61

ENCYCLOPEDIA OF DATA
(Death and Injury Records)

-DEATH/INJURY RECORDS-

	No. of Records	% of Total
SOURCES		
CAL	36	
NJE	32	
NRC	180	
OHE	32	
RG7	13	
TXA	7	
CHP	5	
MMA	8	
NTP	25	
UPI	71	
LAT	17	
CHT	5	
NYT	37	
TOTAL RECORDS	468	

TOP TWENTY SUBSTANCES BY NUMBER OF RECORDS - DEATH/INJURY RECORDS

SUBSTANCE	NUMBER OF RECORDS TOT	NUMBER OF RECORDS % OF TOT	QUANTITY IN POUNDS TOT	QUANTITY IN POUNDS % OF TOT	AVG QUANT PER RECORD
PCBs	13	2.778	16,879	0.058	1,298
SULFURIC ACID	22	4.701	56.527	0.195	2,569
ANHYDROUS AMMONIA	32	6.838	381,957	1.316	11,936
CHLORINE	45	9.615	15,635	0.054	347
HYDROCHLORIC ACID	26	5.556	166,649	0.574	6,410
SODIUM HYDROXIDE	9	1.923	716	0.002	80
METHYL ALCOHOL	2	0.427	55,500	0.191	27,750
METHYL CHLORIDE	0	0.000	0	0.000	NA
TOLUENE	11	2.350	976	0.003	89
NITRIC ACID	7	1.496	150.354	0.518	21.479
VINYL CHLORIDE	5	1.068	10	.000	2
PHOSPHORIC ACID	4	0.855	1,925	0.007	481
FERTILIZER	4	0.855	150,750	0.519	37,688
BENZENE	5	1.068	300	0.001	60
SOLVENT	7	1.496	26.663	0.092	3.809
STYRENE	6	1.282	49,501	0.171	8,250
HYDROGEN SULFIDE	5	1.068	38	.000	8
ETHYLENE DICHLORIDE	0	0.000	0	0.000	NA
TETRACHLOROETHYLENE	2	0.427	2.288	0.008	1.144
SULFUR DIOXIDE	1	0.214	150	0.001	150
ALL OTHERS	262	55.983	27,954,991	96.291	106,698
TOTAL	468	100.000	29,031,809	100.000	62,034

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                    NUMBER OF RECORDS - DEATH/INJURY RECORDS

                TOTAL     * PROCESS VESSEL  * STORAGE VESSEL  * PIPES/VALVES    *     OTHER       *
  RANGE        TOT % OF TOT *    TOT % OF TOT *    TOT % OF TOT *    TOT % OF TOT *    TOT % OF TOT *
                            *                 *                 *                 *                 *
    1           17    7.424 *      1    6.250 *      6   10.000 *      0    0.000 *      1    5.882 *
    2           40   17.467 *      2   12.500 *      8   13.333 *      4   13.333 *      4   23.529 *
    3           78   34.061 *      6   37.500 *     23   38.333 *      9   30.000 *      9   52.941 *
    4           45   19.651 *      5   31.250 *     11   18.333 *     11   36.667 *      1    5.882 *
    5           16    6.987 *      2   12.500 *      2    3.333 *      3   10.000 *      1    5.882 *
    6           15    6.550 *      0    0.000 *      5    8.333 *      1    3.333 *      0    0.000 *
    7            8    3.493 *      0    0.000 *      2    3.333 *      0    0.000 *      0    0.000 *
    8           10    4.367 *      0    0.000 *      3    5.000 *      2    6.667 *      1    5.882 *

TOT            229  100.000 *     16  100.000 *     60  100.000 *     30  100.000 *     17  100.000 *


          EQUIPMENT FAILURE * OPERATOR ERROR  * UPSET CONDITION *     FIRE        *     OTHER       *
  RANGE        TOT % OF TOT *    TOT % OF TOT *    TOT % OF TOT *    TOT % OF TOT *    TOT % OF TOT *
                            *                 *                 *                 *                 *
    1            2    3.922 *      4   15.385 *      1   11.111 *      0    0.000 *      1    7.692 *
    2            9   17.647 *      3   11.538 *      1   11.111 *      0    0.000 *      3   23.077 *
    3           17   33.333 *      8   30.769 *      4   44.444 *      2  100.000 *      5   38.462 *
    4           14   27.451 *      6   23.077 *      1   11.111 *      0    0.000 *      1    7.692 *
    5            2    3.922 *      4   15.385 *      1   11.111 *      0    0.000 *      0    0.000 *
    6            2    3.922 *      0    0.000 *      1   11.111 *      0    0.000 *      2   15.385 *
    7            2    3.922 *      0    0.000 *      0    0.000 *      0    0.000 *      0    0.000 *
    8            3    5.882 *      1    3.846 *      0    0.000 *      0    0.000 *      1    7.692 *

TOT             51  100.000 *     26  100.000 *      9  100.000 *      2  100.000 *     13  100.000 *


             TRUCK          *   RAIL          *   PIPELINE      *   BARGE         *     OTHER       *
  RANGE        TOT % OF TOT *    TOT % OF TOT *    TOT % OF TOT *    TOT % OF TOT *    TOT % OF TOT *
                            *                 *                 *                 *                 *
    1            5    7.246 *      2   14.286 *      0    0.000 *      0    0.000 *      2   40.000 *
    2           13   18.841 *      3   21.429 *      1   50.000 *      0    0.000 *      1   20.000 *
    3           21   30.435 *      3   21.429 *      1   50.000 *      0    0.000 *      2   40.000 *
    4           12   17.391 *      0    0.000 *      0    0.000 *      0    0.000 *      0    0.000 *
    5            6    8.696 *      0    0.000 *      0    0.000 *      2   66.667 *      0    0.000 *
    6            7   10.145 *      2   14.286 *      0    0.000 *      0    0.000 *      0    0.000 *
    7            3    4.348 *      2   14.286 *      0    0.000 *      1   33.333 *      0    0.000 *
    8            2    2.899 *      2   14.286 *      0    0.000 *      0    0.000 *      0    0.000 *

TOT             69  100.000 *     14  100.000 *      2  100.000 *      3  100.000 *      5  100.000 *
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QUANTITY IN POUNDS - DEATH/INJURY RECORDS

	TOTAL		PROCESS VESSEL		STORAGE VESSEL		PIPES/VALVES		OTHER		UNKNOWN	
RANGE	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	103	.000	5	0.011	39	0.001	0	0.000	8	.000	0	0.000
2	2,122	0.007	75	0.162	501	0.018	259	0.056	148	0.001	255	1.616
3	31,707	0.109	1,446	3.115	7,304	0.256	4,252	0.922	4,223	0.018	1,351	8.561
4	168,037	0.579	19,638	42.311	29,803	1.044	56,608	12.275	1,500	0.006	14,175	89.823
5	270,630	0.932	25,250	54.402	28,000	0.981	45,050	9.769	13,000	0.055	0	0.000
6	606,160	2.088	0	0.000	196,250	6.875	37,500	8.132	0	0.000	0	0.000
7	600,500	2.068	0	0.000	200,000	7.007	0	0.000	0	0.000	0	0.000
8	27,352,550	94.216	0	0.000	2,392,550	83.818	317,500	68.847	23,625,000	99.920	0	0.000
TOTAL	29,031,809	100.000	46,414	100.000	2,854,447	100.000	461,169	100.000	23,643,879	100.000	15,781	100.000

	EQUIPMENT FAILURE		OPERATOR ERROR		UPSET CONDITION		FIRE		OTHER		UNKNOWN	
RANGE	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	18	0.001	21	0.009	5	0.011	0	0.000	8	.000	0	0.000
2	646	0.032	163	0.071	25	0.053	0	0.000	75	.000	329	0.034
3	3,900	0.191	2,872	1.257	1,486	3.161	1,300	100.000	3,014	0.013	6,004	0.613
4	63,346	3.103	22,803	9.983	5,000	10.635	0	0.000	2,250	0.009	28,325	2.891
5	23,300	1.141	60,000	26.269	13,000	27.650	0	0.000	0	0.000	15,000	1.531
6	82,500	4.042	0	0.000	27,500	58.491	0	0.000	93,750	0.395	30,000	3.062
7	200,000	9.798	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
8	1,667,500	81.692	142,550	62.410	0	0.000	0	0.000	23,625,000	99.582	900,000	91.869
TOTAL	2,041,210	100.000	228,409	100.000	47,016	100.000	1,300	100.000	23,724,097	100.000	979,658	100.000

	TRUCK		RAIL		PIPELINE		BARGE		OTHER	
RANGE	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	24	0.002	9	0.002	0	0.000	0	0.000	18	1.327
2	616	0.046	68	0.014	100	9.091	0	0.000	100	7.375
3	8,943	0.665	1,950	0.398	1,000	90.909	0	0.000	1,238	91.298
4	46,313	3.443	0	0.000	0	0.000	0	0.000	0	0.000
5	111,330	8.276	0	0.000	0	0.000	48,000	27.746	0	0.000
6	262,410	19.508	60,000	12.257	0	0.000	50,000	28.902	0	0.000
7	175,500	13.047	150,000	30.642	0	0.000	75,000	43.353	0	0.000
8	740,000	55.013	277,500	56.687	0	0.000	0	0.000	0	0.000
TOTAL	1,345,136	100.000	489,527	100.000	1,100	100.000	173,000	100.000	1,356	100.000

REPORTABLE QUANTITIES - DEATH/INJURY RECORDS

RQ	No. of Records	% of Total
1	13	2.778
10	60	12.821
100	56	11.966
1000	63	13.462
5000	47	10.043
N/A	229	48.932
Total	468	100.000

Quantity Released/RQ for Death/Injury Records

Range	No. of Records
0.00 - 1.00	49
1.01 - 10.00	34
10.01 - 100.00	36
100.01 - 1000.00	16
1000.01 +	4

ENCYCLOPEDIA OF DATA
(Death and Injury Records)

	-DEATH RECORDS ONLY-		-INJURY RECORDS ONLY-	
	No. of Records	% of Total	No. of Records	% of Total
SUBSTANCE STATE				
Solid	4	6.25	26	5.66
Liquid	45	70.31	316	68.85
Gas	16	25.00	109	23.75
Unknown	15	23.44	80	17.43
Solid Waste	0	0.00	2	0.44
Liquid Waste	1	1.56	13	2.83
Gas Waste	0	0.00	2	0.44
Unknown Waste	1	1.56	2	0.44
Total Solid	4	6.25	28	6.10
Total Liquid	46	71.88	329	71.68
Total Gas	16	25.00	111	24.18
PROPERTY DAMAGE				
Yes	45	70.31	161	35.08
No	3	4.69	86	18.74
Unknown	16	25.00	212	46.19
ENVIRONMENTAL DAMAGE				
Yes	3	4.69	45	9.80
No	2	3.13	51	11.11
Unknown	59	92.19	363	79.08
AIR MEDIA AFFECTED				
Yes	56	87.50	304	66.23
No	1	1.56	17	3.70
Unknown	7	10.94	138	30.07
WATER MEDIA AFFECTED				
Yes	7	10.94	50	10.89
No	8	12.50	153	33.33
Unknown	49	76.56	256	55.77
LAND MEDIA AFFECTED				
Yes	9	14.06	154	33.55
No	5	7.81	74	16.12
Unknown	50	78.13	231	50.33
HIGH TEMPERATURE				
Yes	6	11.76	21	7.05
No	5	9.80	37	12.42
Unknown	40	78.43	240	80.54
HIGH PRESSURE				
Yes	5	9.80	26	8.72
No	4	7.84	34	11.41
Unknown	42	82.35	238	79.87

ENCYCLOPEDIA OF DATA
(Death and Injury Records)

	-DEATH RECORDS ONLY-		-INJURY RECORDS ONLY-	
	No. of Records	% of Total	No. of Records	% of Total
EVACUATION?				
Yes	25	39.06	153	33.33
No	5	7.81	71	15.47
Unknown	34	53.13	235	51.20
DEATHS?				
Yes	64	100.00	55	11.98
No	0	0.00	377	82.14
Unknown	0	0.00	27	5.88
INJURIES?				
Yes	55	85.94	459	100.00
No	5	7.81	0	0.00
Unknown	4	6.25	0	0.00
IN-PLANT	51	79.69	298	64.92
IN-TRANSIT	13	20.31	161	35.08
IN-PLANT LOCATION				
Process Vessel	5	9.80	39	13.09
Storage Vessel	16	31.37	108	36.24
Valves/Pipes	4	7.84	51	17.11
Other	9	17.65	44	14.77
Unknown	17	33.33	56	18.79
IN-PLANT CAUSE				
Equipment Failure	4	7.84	83	27.85
Operator Error	7	13.73	38	12.75
Upset Conditions	0	0.00	14	4.70
Fire	2	3.92	24	8.05
Other	3	5.88	21	7.05
Unknown	35	68.63	118	39.60
OPERATIONAL CONFIGURATION				
Loading/Unloading	7	13.73	55	18.46
Steady State	4	7.84	39	13.09
Start-Up	1	1.96	5	1.68
Shut Down	0	0.00	5	1.68
Maintenance	4	7.84	13	4.36
Other	7	13.73	21	7.05
Unknown	28	54.90	162	54.36
IN-TRANSIT MODE				
Truck	9	69.23	110	68.32
Rail	2	15.38	32	19.88
Barge	1	7.69	8	4.97
Pipeline	1	7.69	3	1.86
Other	0	0.00	8	4.97

- ENCYCLOPEDIA OF DATA
(Death and Injury Records)

	-DEATH RECORDS ONLY-		-INJURY RECORDS ONLY-	
	No. of Records	% of Total	No. of Records	% of Total
IN-TRANSIT CAUSE				
Leak	0	0.00	55	34.16
Collision	6	46.15	69	42.86
Other	6	46.15	25	15.53
Unknown	1	7.69	12	7.45
END EFFECTS				
Spill	18	28.13	251	54.68
Vapor Release	26	40.63	241	52.51
Fire	42	65.63	123	26.80
Explosion	45	70.31	104	22.66
Other	0	0.00	4	0.87
PROCESS VESSEL AND:				
Equipment Failure	0	0.00	14	35.90
Operator Error	2	40.00	6	15.38
Upset Conditions	0	0.00	5	12.82
Fire	0	0.00	0	0.00
Other	0	0.00	2	5.13
Unknown	3	60.00	12	30.77
STORAGE VESSEL AND:				
Equipment Failure	0	0.00	25	23.15
Operator Error	4	25.00	20	18.52
Upset Conditions	0	0.00	6	5.56
Fire	1	6.25	7	6.48
Other	0	0.00	8	7.41
Unknown	11	68.75	42	38.89
VALVES/PIPES AND:				
Equipment Failure	3	75.00	35	68.63
Operator Error	0	0.00	6	11.76
Upset Conditions	0	0.00	1	1.96
Fire	0	0.00	1	1.96
Other	0	0.00	3	5.88
Unknown	1	25.00	5	9.80
OTHER LOCATION AND:				
Equipment Failure	0	0.00	8	18.18
Operator Error	1	11.11	5	11.36
Upset Conditions	0	0.00	1	2.27
Fire	0	0.00	1	2.27
Other	2	22.22	7	15.91
Unknown	6	66.67	22	50.00

ENCYCLOPEDIA OF DATA
(Death and Injury Records)

	-DEATH RECORDS ONLY-		-INJURY RECORDS ONLY-	
	No. of Records	% of Total	No. of Records	% of Total
PROCESS VESSEL AND:				
Loading/Unloading	0	0.00	1	2.56
Steady State	0	0.00	10	25.64
Start-Up	1	20.00	3	7.69
Shut Down	0	0.00	0	0.00
Maintenance	1	20.00	4	10.26
Other	1	20.00	3	7.69
Unknown	2	40.00	18	46.15
STORAGE VESSEL AND:				
Loading/Unloading	3	18.75	37	34.26
Steady State	0	0.00	7	6.48
Start-Up	0	0.00	0	0.00
Shut Down	0	0.00	1	0.93
Maintenance	2	12.50	5	4.63
Other	3	18.75	8	7.41
Unknown	8	50.00	50	46.30
VALVES/PIPES AND:				
Loading/Unloading	1	25.00	8	15.69
Steady State	1	25.00	12	23.53
Start-Up	0	0.00	1	1.96
Shut Down	0	0.00	1	1.96
Maintenance	0	0.00	1	1.96
Other	0	0.00	0	0.00
Unknown	2	50.00	28	54.90
OTHER LOCATIONS AND:				
Loading/Unloading	1	11.11	5	11.36
Steady State	3	33.33	10	22.73
Start-Up	0	0.00	1	2.27
Shut Down	0	0.00	3	6.82
Maintenance	0	0.00	1	2.27
Other	3	33.33	10	22.73
Unknown	2	22.22	14	31.82

ENCYCLOPEDIA OF DATA
(Death and Injury Records)

	-DEATH RECORDS ONLY-		-INJURY RECORDS ONLY-	
	No. of Records	% of Total	No. of Records	% of Total
SOURCES				
CAL	1		36	
NJE	3		31	
NRC	4		179	
OHE	4		30	
RG7	3		13	
TXA	0		7	
CHP	0		5	
MMA	5		8	
NTP	7		24	
UPI	22		68	
LAT	4		17	
CHT	0		5	
NYT	11		36	
TOTAL RECORDS	64		459	

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TOP TWENTY SUBSTANCES BY NUMBER OF RECORDS - DEATH RECORDS


                        NUMBER OF RECORDS *  QUANTITY IN POUNDS    * AVG QUANT  *
SUBSTANCE                 TOT  % OF TOT   *          TOT  % OF TOT * PER RECORD *
PCBs                                      *                        *            *
SULFURIC ACID               0     0.000   *            0     0.000 *         NA *
ANHYDROUS AMMONIA           2    11.765   *        7,500     0.030 *      3,750 *
CHLORINE                    1     5.882   *        3,750     0.015 *      3,750 *
HYDROCHLORIC ACID           3    17.647   *        2,225     0.009 *        742 *
SODIUM HYDROXIDE            0     0.000   *            0     0.000 *         NA *
METHYL ALCOHOL              1     5.882   *          100      .000 *        100 *
METHYL CHLORIDE             0     0.000   *            0     0.000 *         NA *
TOLUENE                     0     0.000   *            0     0.000 *         NA *
NITRIC ACID                 3    17.647   *            0     0.000 *          0 *
VINYL CHLORIDE              1     5.882   *            0     0.000 *          0 *
PHOSPHORIC ACID             0     0.000   *            0     0.000 *         NA *
FERTILIZER                  0     0.000   *            0     0.000 *         NA *
BENZENE                     0     0.000   *            0     0.000 *         NA *
SOLVENT                     1     0.214   *            0     0.000 *          0 *
STYRENE                     1     0.214   *            0     0.000 *          0 *
HYDROGEN SULFIDE            0     0.000   *            0     0.000 *         NA *
ETHYLENE DICHLORIDE         2     0.427   *            0     0.000 *          0 *
TETRACHLOROETHYLENE         0     0.000   *            0     0.000 *         NA *
SULFUR DIOXIDE              0     0.000   *            0     0.000 *         NA *
ALL OTHERS                  0     0.000   *            0     0.000 *         NA *
                            2     0.427   *   24,780,338    85.356 * 12,390,169 *
TOTAL                                                              *            *
                           17   100.000   *   24,793,913   100.000 *  1,458,465 *
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NUMBER OF RECORDS - DEATH RECORDS ONLY

RANGE.	TOTAL		PROCESS VESSEL		STORAGE VESSEL		PIPES/VALVES		OTHER	
	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT
1	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
2	2	11.765	0	0.000	0	0.000	0	0.000	0	0.000
3	1	5.882	0	0.000	0	0.000	0	0.000	0	0.000
4	5	29.412	1	50.000	0	0.000	0	0.000	0	0.000
5	3	17.647	1	50.000	0	0.000	2	100.000	0	0.000
6	2	11.765	0	0.000	1	50.000	0	0.000	0	0.000
7	2	11.765	0	0.000	0	0.000	0	0.000	0	0.000
8	2	11.765	0	0.000	1	50.000	0	0.000	1	100.000
TOT	17	100.000	2	100.000	2	100.000	2	100.000	1	100.000

RANGE	EQUIPMENT FAILURE		OPERATOR ERROR		UPSET CONDITION		FIRE		OTHER	
	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT
1	0	0.000	0	0.000	0	NA	0	NA	0	0.000
2	1	33.333	0	0.000	0	NA	0	NA	0	0.000
3	0	0.000	0	0.000	0	NA	0	NA	0	0.000
4	2	66.667	1	50.000	0	NA	0	NA	0	0.000
5	0	0.000	1	50.000	0	NA	0	NA	0	0.000
6	0	0.000	0	0.000	0	NA	0	NA	0	0.000
7	0	0.000	0	0.000	0	NA	0	NA	0	0.000
8	0	0.000	0	0.000	0	NA	0	NA	1	100.000
TOT	3	100.000	2	100.000	0	NA	0	NA	1	100.000

RANGE	TRUCK		RAIL		PIPELINE		BARGE		OTHER	
	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT
1	0	0.000	0	NA	0	NA	0	0.000	0	NA
2	1	16.667	0	NA	0	NA	0	0.000	0	NA
3	0	0.000	0	NA	0	NA	0	0.000	0	NA
4	1	16.667	0	NA	0	NA	0	0.000	0	NA
5	1	16.667	0	NA	0	NA	1	100.000	0	NA
6	1	16.667	0	NA	0	NA	0	0.000	0	NA
7	2	33.333	0	NA	0	NA	0	0.000	0	NA
8	0	0.000	0	NA	0	NA	0	0.000	0	NA
TOT	6	100.000	0	NA	0	NA	1	100.000	0	NA

QUANTITY IN POUNDS - DEATH RECORDS ONLY

RANGE	TOTAL		PROCESS VESSEL		STORAGE VESSEL		PIPES/VALVES		OTHER		UNKNOWN	
	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
2	138	0.001	0	0.000	0	0.000	0	0.000	0	0.000	100	4.706
3	225	0.001	0	0.000	0	0.000	0	0.000	0	0.000	225	10.588
4	22,550	0.091	2,000	12.500	0	0.000	15,000	100.000	0	0.000	1,800	84.706
5	55,000	0.222	14,000	87.500	0	0.000	0	0.000	0	0.000	0	0.000
6	71,000	0.286	0	0.000	30,000	3.226	0	0.000	0	0.000	0	0.000
7	120,000	0.484	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
8	24,525,000	98.915	0	0.000	900,000	96.774	0	0.000	23,625,000	100.000	0	0.000
TOTAL	24,793,913	100.000	16,000	100.000	930,000	100.000	15,000	100.000	23,625,000	100.000	2,125	100.000

RANGE	EQUIPMENT FAILURE		OPERATOR ERROR		UPSET CONDITION		FIRE		OTHER		UNKNOWN	
	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	0	0.000	0	0.000	0	NA	0	NA	0	0.000	0	0.000
2	100	0.662	0	0.000	0	NA	0	NA	0	0.000	0	0.000
3	0	0.000	0	0.000	0	NA	0	NA	0	0.000	225	0.024
4	15,000	99.338	2,000	12.500	0	NA	0	NA	0	0.000	1,800	0.193
5	0	0.000	14,000	87.500	0	NA	0	NA	0	0.000	0	0.000
6	0	0.000	0	0.000	0	NA	0	NA	0	0.000	30,000	3.219
7	0	0.000	0	0.000	0	NA	0	NA	0	0.000	0	0.000
8	0	0.000	0	0.000	0	NA	0	NA	23,625,000	100.000	900,000	96.564
TOTAL	15,100	100.000	16,000	100.000	0	NA	0	NA	23,625,000	100.000	932,025	100.000

RANGE	TRUCK		RAIL		PIPELINE		BARGE		OTHER	
	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	0	0.000	0	NA	0	NA	0	0.000	0	NA
2	38	0.021	0	NA	0	NA	0	0.000	0	NA
3	0	0.000	0	NA	0	NA	0	0.000	0	NA
4	3,750	2.052	0	NA	0	NA	0	0.000	0	NA
5	18,000	9.847	0	NA	0	NA	23,000	100.000	0	NA
6	41,000	22.430	0	NA	0	NA	0	0.000	0	NA
7	120,000	65.650	0	NA	0	NA	0	0.000	0	NA
8	0	0.000	0	NA	0	NA	0	0.000	0	NA
TOTAL	182,788	100.000	0	NA	0	NA	23,000	100.000	0	NA

TOP TWENTY SUBSTANCES BY NUMBER OF RECORDS - INJURY RECORDS

SUBSTANCE	NUMBER OF RECORDS TOT	NUMBER OF RECORDS % OF TOT	QUANTITY IN POUNDS TOT	QUANTITY IN POUNDS % OF TOT	AVG QUANT PER RECORD
PCBs	13	5.752	16,879	0.058	1,298
SULFURIC ACID	21	9.292	56,527	0.195	2.692
ANHYDROUS AMMONIA	31	13.717	378,207	1.306	12,200
CHLORINE	45	19.912	15,635	0.054	347
HYDROCHLORIC ACID	26	11.504	166,649	0.576	6,410
SODIUM HYDROXIDE	9	3.982	716	0.002	80
METHYL ALCOHOL	2	0.885	55,500	0.192	27,750
METHYL CHLORIDE	0	0.000	0	0.000	NA
TOLUENE	11	4.867	976	0.003	89
NITRIC ACID	7	3.097	150,354	0.519	21.479
VINYL CHLORIDE	5	1.068	10	.000	2
PHOSPHORIC ACID	4	0.855	1,925	0.007	481
FERTILIZER	4	0.855	150,750	0.519	37,688
BENZENE	5	1.068	300	0.001	60
SOLVENT	7	1.496	26,663	0.092	3,809
STYRENE	6	1.282	49,501	0.171	8.250
HYDROGEN SULFIDE	5	1.068	38	.000	8
ETHYLENE DICHLORIDE	0	0.000	0	0.000	NA
TETRACHLOROETHYLENE	2	0.427	2,288	0.008	1,144
SULFUR DIOXIDE	1	0.214	150	0.001	150
ALL OTHERS	22	4.701	27,876,991	96.022	1,267,136
TOTAL	226	100.000	28,950,059	100.000	128,098

NUMBER OF RECORDS - INJURY RECORDS ONLY

RANGE	TOTAL		PROCESS VESSEL		STORAGE VESSEL		PIPES/VALVES		OTHER	
	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT
1	17	7.522	1	6.250	6	10.000	0	0.000	1	5.882
2	40	17.699	2	12.500	8	13.333	4	13.333	4	23.529
3	78	34.513	6	37.500	23	38.333	9	30.000	9	52.941
4	44	19.469	5	31.250	11	18.333	11	36.667	1	5.882
5	15	6.637	2	12.500	2	3.333	3	10.000	1	5.882
6	15	6.637	0	0.000	5	8.333	1	3.333	0	0.000
7	7	3.097	0	0.000	2	3.333	0	0.000	0	0.000
8	10	4.425	0	0.000	3	5.000	2	6.667	1	5.882
TOT	226	100.000	16	100.000	60	100.000	30	100.000	17	100.000

RANGE	EQUIPMENT FAILURE		OPERATOR ERROR		UPSET CONDITION		FIRE		OTHER	
	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT
1	2	3.922	4	15.385	1	11.111	0	0.000	1	7.692
2	9	17.647	3	11.538	1	11.111	0	0.000	3	23.077
3	17	33.333	8	30.769	4	44.444	2	100.000	5	38.462
4	14	27.451	6	23.077	1	11.111	0	0.000	1	7.692
5	2	3.922	4	15.385	1	11.111	0	0.000	0	0.000
6	2	3.922	0	0.000	1	11.111	0	0.000	2	15.385
7	2	3.922	0	0.000	0	0.000	0	0.000	0	0.000
8	3	5.882	1	3.846	0	0.000	0	0.000	1	7.692
TOT	51	100.000	26	100.000	9	100.000	2	100.000	13	100.000

RANGE	TRUCK		RAIL		PIPELINE		BARGE		OTHER	
	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT	TOT	% OF TOT
1	5	7.576	2	14.286	0	0.000	0	0.000	2	40.000
2	13	19.697	3	21.429	1	50.000	0	0.000	1	20.000
3	21	31.818	3	21.429	1	50.000	0	0.000	2	40.000
4	11	16.667	0	0.000	0	0.000	0	0.000	0	0.000
5	5	7.576	0	0.000	0	0.000	2	66.667	0	0.000
6	7	10.606	2	14.286	0	0.000	0	0.000	0	0.000
7	2	3.030	2	14.286	0	0.000	1	33.333	0	0.000
8	2	3.030	2	14.286	0	0.000	0	0.000	0	0.000
TOT	66	100.000	14	100.000	2	100.000	3	100.000	5	100.000

QUANTITY IN POUNDS - INJURY RECORDS ONLY

RANGE	TOTAL		PROCESS VESSEL		STORAGE VESSEL		PIPES/VALVES		OTHER		UNKNOWN	
	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	103	.000	5	0.011	39	0.001	0	0.000	8	.000	0	0.000
2	2,122	0.007	75	0.162	501	0.018	259	0.056	148	0.001	255	1.616
3	31,707	0.110	1,446	3.115	7,304	0.256	4,252	0.922	4,223	0.018	1,351	8.561
4	164,287	0.567	19,638	42.311	29,803	1.044	56,608	12.275	1,500	0.006	14,175	89.823
5	252,630	0.873	25,250	54.402	28,000	0.981	45,050	9.769	13,000	0.055	0	0.000
6	606,160	2.094	0	0.000	196,250	6.875	37,500	8.132	0	0.000	0	0.000
7	540,500	1.867	0	0.000	200,000	7.007	0	0.000	0	0.000	0	0.000
8	27,352,550	94.482	0	0.000	2,392,550	83.818	317,500	68.847	23,625,000	99.920	0	0.000
TOTAL	28,950,059	100.000	46,414	100.000	2,854,447	100.000	461,169	100.000	23,643,879	100.000	15,781	100.000

RANGE	EQUIPMENT FAILURE		OPERATOR ERROR		UPSET CONDITION		FIRE		OTHER		UNKNOWN	
	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	18	0.001	21	0.009	5	0.011	0	0.000	8	.000	0	0.000
2	646	0.032	163	0.071	25	0.053	0	0.000	75	.000	329	0.034
3	3,900	0.191	2,872	1.257	1,486	3.161	1,300	100.000	3,014	0.013	6,004	0.613
4	63,346	3.103	22,803	9.983	5,000	10.635	0	0.000	2,250	0.009	28,325	2.891
5	23,300	1.141	60,000	26.269	13,000	27.650	0	0.000	0	0.000	15,000	1.531
6	82,500	4.042	0	0.000	27,500	58.491	0	0.000	93,750	0.395	30,000	3.062
7	200,000	9.798	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
8	1,667,500	81.692	142,550	62.410	0	0.000	0	0.000	23,625,000	99.582	900,000	91.869
TOTAL	2,041,210	100.000	228,409	100.000	47,016	100.000	1,300	100.000	23,724,097	100.000	979,658	100.000

RANGE	TRUCK		RAIL		PIPELINE		BARGE		OTHER	
	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT	TOTAL	PERCENT
1	24	0.002	9	0.002	0	0.000	0	0.000	18	1.327
2	616	0.049	68	0.014	100	9.091	0	0.000	100	7.375
3	8,943	0.708	1,950	0.398	1,000	90.909	0	0.000	1,238	91.298
4	42,563	3.369	0	0.000	0	0.000	0	0.000	0	0.000
5	93,330	7.387	0	0.000	0	0.000	48,000	27.746	0	0.000
6	262,410	20.770	60,000	12.257	0	0.000	50,000	28.902	0	0.000
7	115,500	9.142	150,000	30.642	0	0.000	75,000	43.353	0	0.000
8	740,000	58.573	277,500	56.687	0	0.000	0	0.000	0	0.000
TOTAL	1,263,386	100.000	489,527	100.000	1,100	100.000	173,000	100.000	1,356	100.000

APPENDIX F

DATABASE SUMMARY FOR RECORDS REPORTING SPILL OR VAPOR RELEASE AS WORST END EFFECT

ENCYCLOPEDIA OF DATA
(Records with Spill or Vapor Release as Worst End Effect)

	No. of Records	% of Total
SUBSTANCE STATE		
Solid	137	2.31
Liquid	4732	79.88
Gas	916	15.46
Unknown	270	4.56
Solid Waste	34	0.57
Liquid Waste	222	3.75
Gas Waste	54	0.91
Unknown Waste	2	0.03
Total Solid	171	2.89
Total Liquid	4954	83.63
Total Gas	970	16.37
PROPERTY DAMAGE		
Yes	174	2.94
No	1703	28.75
Unknown	4047	68.32
ENVIRONMENTAL DAMAGE		
Yes	151	2.55
No	620	10.47
Unknown	5153	86.99
AIR MEDIA AFFECTED		
Yes	1662	28.06
No	303	5.11
Unknown	3959	66.83
WATER MEDIA AFFECTED		
Yes	910	15.36
No	2434	41.09
Unknown	2580	43.55
LAND MEDIA AFFECTED		
Yes	3235	54.61
No	752	12.69
Unknown	1937	32.70
HIGH TEMPERATURE		
Yes	87	1.96
No	794	17.87
Unknown	3559	80.10
HIGH PRESSURE		
Yes	129	2.90
No	774	17.42
Unknown	3537	79.61

ENCYCLOPEDIA OF DATA
(Records with Spill or Vapor Release as Worst End Effect)

	No. of Records	% of Total
EVACUATION?		
Yes	209	3.53
No	1082	18.26
Unknown	4633	78.21
DEATHS?		
Yes	14	0.24
No	5456	92.10
Unknown	454	7.66
INJURIES?		
Yes	286	4.83
No	4930	83.22
Unknown	694	11.72
IN-PLANT	4443	75.00
IN-TRANSIT	1481	25.00
IN-PLANT LOCATION		
Process Vessel	516	11.61
Storage Vessel	923	20.77
Valves/Pipes	894	20.12
Other	1312	29.53
Unknown	798	17.96
IN-PLANT CAUSE		
Equipment Failure	2101	47.29
Operator Error	553	12.45
Upset Conditions	134	3.02
Fire	95	2.14
Other	679	15.28
Unknown	881	19.83
OPERATIONAL CONFIGURATION		
Loading/Unloading	740	16.66
Steady State	1501	33.78
Start-Up	39	0.88
Shut Down	21	0.47
Maintenance	104	2.34
Other	106	2.39
Unknown	1932	43.48
IN-TRANSIT MODE		
Truck	832	56.18
Rail	548	37.00
Barge	35	2.36
Pipeline	35	2.36
Other	31	2.09

ENCYCLOPEDIA OF DATA
(Records with Spill or Vapor Release as Worst End Effect)

	No. of Records	% of Total
IN-TRANSIT CAUSE		
Leak	626	42.27
Collision	294	19.85
Other	463	31.26
Unknown	98	6.62
END EFFECTS		
Spill	4809	81.18
Vapor Release	1643	27.73
Fire	0	0.00
Explosion	0	0.00
Other	20	0.34
PROCESS VESSEL AND:		
Equipment Failure	208	40.31
Operator Error	75	14.53
Upset Conditions	81	15.70
Fire	4	0.78
Other	70	13.57
Unknown	78	15.12
STORAGE VESSEL AND:		
Equipment Failure	330	35.75
Operator Error	280	30.34
Upset Conditions	17	1.84
Fire	8	0.87
Other	143	15.49
Unknown	145	15.71
VALVES/PIPES AND:		
Equipment Failure	618	69.13
Operator Error	101	11.30
Upset Conditions	6	0.67
Fire	0	0.00
Other	111	12.42
Unknown	58	6.49
OTHER LOCATION AND:		
Equipment Failure	602	45.88
Operator Error	90	6.86
Upset Conditions	19	1.45
Fire	51	3.89
Other	273	20.81
Unknown	277	21.11

ENCYCLOPEDIA OF DATA
(Records with Soill or Vapor Release as Worst End Effect)

	No. of Records	% of Total
PROCESS VESSEL AND:		
Loading/Unloading	19	3.68
Steady State	263	50.97
Start-Up	16	3.10
Shut Down	8	1.55
Maintenance	6	1.16
Other	2	0.39
Unknown	202	39.15
STORAGE VESSEL AND:		
Loading/Unloading	388	42.04
Steady State	218	23.62
Start-Up	0	0.00
Shut Down	2	0.22
Maintenance	3	0.33
Other	46	4.98
Unknown	266	28.82
VALVES/PIPES AND:		
Loading/Unloading	192	21.48
Steady State	271	30.31
Start-Up	14	1.57
Shut Down	1	0.11
Maintenance	55	6.15
Other	12	1.34
Unknown	349	39.04
OTHER LOCATIONS AND:		
Loading/Unloading	81	6.17
Steady State	724	55.18
Start-Up	5	0.38
Shut Down	5	0.38
Maintenance	38	2.90
Other	35	2.67
Unknown	424	32.32

ENCYCLOPEDIA OF DATA
(Records with Soill or Vapor Release as Worst End Effect)

	No. of Records	% of Total
SOURCES		
CAL	116	
NJE	92	
NRC	4392	
OHE	231	
RG7	461	
TXA	427	
CHP	65	
MMA	0	
NTP	39	
UPI	67	
LAT	12	
CHT	2	
NYT	20	
TOTAL RECORDS	5924	

APPENDIX G

LIST OF EVENTS IN WHICH INJURIES OCCURRED

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10/30/85

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
10/10/82	NEWARK	NJ	McKesson Enviro-Systems	0	Solvent	0		0		P	6	0
08/15/84	DALLAS	TX	McLean Trucking	15	Acetic Acid	0		0		T	3	0
06/13/84	ROCHELLE	IL	Caron International	150	Acetic Acid	0		0		P	1	0
02/29/84	ALVIN	TX	Matlack Chemical	0	Acetic Acid	0		0		T	1	0
08/30/83	COLUMBIA	SC	Carolina Eastman Co.	2363	Acetic Acid	0		0		P	4	0
07/03/81	THORP	WI	Unknown	127500	Acetic Anhydride	0		0		T	3	0
12/15/83	LOS ANGELES	CA	United Parcel Service	30	Acetic Anhydride	0		0		P	23	0
10/10/84	GORMAN	CA	Unknown	563	Acetone	0		0		T	1	0
03/07/85	CHARLESTON	WV	Union Carbide	5300	Acetone	100	Mesityl Oxide	0		P	4	0
08/15/84	SIMSBURY	CT	Ensign - Brickford Industries	0	Acetone/Nitric Acid	0		0		P	0	3
11/03/83	DETROIT	MI	A.G.A. Burdox Industrial Gases and Equipment	0	Acetylene	0		0		P	3	0
04/09/81	DETROIT	MI	Unknown	0	Acid	0		0		P	19	0
06/22/81	ELMHURST	NY	McLean Trucking	413	Acid	0		0		P	12	0
02/24/85	HILLSBROUGH	NJ	National Dinostics	0	Acrylamide	0	Diphenyloxazole	0		P	2	0
06/01/83	GRACYVILLE	LA	Ent. Transportation Co.	20	Acrylic Acid	0		0		T	2	0
03/13/85	SANTA ANA	CA	Unknown	413	Acrylic Resin	0		0		T	40	0
04/26/82	AKRON	OH	Goodyear Tire and Rubber	157500	Acrylonitrile	0		0		P	1	0
11/01/83	FREEPORT	TX	Sohio Chem.	0	Acrylonitrile	0		0		T	2	0
03/26/84	TEXAS CITY	TX	Monsanto Co.	50000	Acrylonitrile	0		0		T	2	0
01/03/82	GALVESTON	TX	Unknown	400000	Acrylonitrile	0		0		T	1	0
02/28/80	DE SOTO	KS	Sunflower Army Ammunition Plant	0	Alcohol	0		0		P	1	1
12/17/84	MERCED	CA	Unknown	300	Alkali	0	Ferric Chloride	0		T	4	0
12/20/81	TEXARKANA	TX	Unknown	0	Allyl Alcohol	0		0		T	2	0
11/16/84	NAUGATUCK	CT	C-line Inc.	0	Allyl Alcohol	0		0		T	1	0
05/25/85	KANSAS CITY	MO	Yellow Freight	413	Allyl Glycidylether	0		0		P	2	0
09/24/81	RARITAN TOWNSHIP	NJ	United States Metal Powders	0	Aluminum	0		0		P	5	0
07/27/84	HOUSTON	TX	Unknown	23000	Aluminum Phosphide	0		0		T	8	1
02/18/85	COLUMBUS	OH	City Products Corp.	0	Ammonia	0		0		P	20	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
12/17/82	LIMA	OH	Vistron	0	Ammonia	0		0		P	1	0
08/06/84	SUNNY VALE	CA	Unknown	188	Ammonia	0		0		P	2	0
07/14/84	FONTANA	CA	Lowe Ice Distributor	1875	Ammonia	0		0		P	3	0
02/16/84	SAN ANGELO	TX	Unknown	0	Ammonia	0		0		P	1	0
02/13/84	COLUMBIA	TX	Unknown	250	Ammonia	0		0		T	2	0
07/17/84	VERNON	CA	Delta Meat Packing	2250	Ammonia	0		0		P	60	0
11/12/84	BATESVILLE	AK	Arkansas Poultry	0	Ammonia	0		0		P	35	0
05/29/85	SAN ANTONIO	TX	Lone Star Ice House	0	Ammonia	0		0		P	10	3
07/18/82	BAYTOWN	TX	Chemical Exchange Refinery	0	Ammonia	0		0		P	14	0
09/13/84	DAYTON	WA	Inland Transportation Co.	0	Ammonia	0		0		T	1	0
08/10/84	SANTA ANA	CA	Unknown	188	Ammonium Chloride	0		0		P	6	0
09/08/83	CHERRYFIELD	ME	Cherryfield	500	Ammonium Sulfate	0		0		P	1	0
08/17/84	COLUMBUS	OH	Quality Bakery	75	Anhydrous Ammonia	0		0		P	2	0
07/13/84	MARION	OH	Union Tank Car Co.	750	Anhydrous Ammonia	0		0		T	4	0
06/16/84		OH	Duane Martin Farm	3750	Anhydrous Ammonia	0		0		T	0	1
06/02/84	DOVER	OH	Roger Spies	7500	Anhydrous Ammonia	0		0		P	1	0
07/20/83	EDMUND	KS	Missouri Pacific	0	Anhydrous Ammonia	0		0		T	1	0
08/07/83	WICHITA	KS	Santa Fe Railroad	30000	Anhydrous Ammonia	0		0		T	2	0
11/05/83	ROSSWELL	NM	Petro Park Limited	0	Anhydrous Ammonia	0		0		P	1	0
03/07/84	ST JAMES PARRISH	LA	Agrico Chemical Co.	1000	Anhydrous Ammonia	0		0		T	1	0
04/25/84	UNDERWOOD	IA	W.R. Grace Co.	3500	Anhydrous Ammonia	0		0		T	1	0
06/10/84	NAPLES	IL	Norfolk & Western Railroad	0	Anhydrous Ammonia	0		0		T	2	0
04/21/83	ST LOUIS	MO	Anheuser Busch Inc.	0	Anhydrous Ammonia	0		0		P	2	0
08/07/83	MULBANE	KS	F.R.A.	30000	Anhydrous Ammonia	0		0		T	2	0
08/05/83	ESCONDIDO	CA	Industrial Chemicals	413	Anhydrous Ammonia	0		0		P	1	0
08/10/83	LONE WOLF	OK	Planters Co-op Association	160000	Anhydrous Ammonia	0		0		P	1	0
08/30/83	BERKLEY COUNTY	SC	Mobay Chemical	1600	Anhydrous Ammonia	0		0		P	4	0
01/06/83	PASADENA	TX	Occidental Chemical	1343	Anhydrous Ammonia	0		0		P	3	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
09/07/84	VISALIA	CA	Sequoia Feed	188	Anhydrous Ammonia	0		0		P	1	0
11/11/84	BURBANK	CA	Baskin-Robbins	3750	Anhydrous Ammonia	0		0		P	9	0
11/14/84	BURBANK	CA	Unknown	563	Anhydrous Ammonia	0		0		P	3	0
12/02/84	BURBANK	CA	Unknown	188	Anhydrous Ammonia	0		0		P	1	0
01/12/85	ONTARIO	CA	Unknown	187	Anhydrous Ammonia	0		0		P	10	0
12/08/84	BRENTWOOD	MO	Ice Cream Specialties	0	Anhydrous Ammonia	0		0		P	2	0
11/09/83	DANVILLE	IN	Hendricks County Farm Bu. Co-op.	11250	Anhydrous Ammonia	0		0		P	4	0
06/11/81	BARNESVILLE	MN	Farmland Industries	100000	Anhydrous Ammonia	0		0		P	30	0
09/09/83	ORANGEBURG	SC	Royster Transport Co.	0	Anhydrous Ammonia	0		0		T	1	0
05/17/84	VINELAND	CO	Phillips Chemical Co.	15000	Anhydrous Ammonia	0		0		T	26	0
05/31/84	KINDRICK	ID	George F. Brocke & Son Co.	5000	Anhydrous Ammonia	0		0		T	1	0
07/30/84	NOLA	LA	Unknown	0	Anhydrous Ammonia	0		0		T	1	0
01/16/84	EREA	CA	Union Chemical Oil Co.	2000	Anhydrous Ammonia	0		0		P	1	0
10/20/83	ST. JAMES PARRISH	LA	Gulf Central Pipeline Co.	100	Anhydrous Ammonia	0		0		T	3	0
09/21/83	LAMPASAS	TX	Ralston Purina	3750	Anhydrous Ammonia	0		0		P	1	0
02/17/83	INGLESIDE	TX	Dupont	12000	Anhydrous Hydrochloric Acid	50	Chlorine	0		P	3	0
11/25/84	ELIZABETH	NJ	Union Carbide	0	Anhydrous Trimethylamine	0		0		T	2	0
05/12/84	HEATH	OH	Koppers Refinery	0	Asphalt	0		0		P	1	0
10/10/84	PISCATAWAY	NJ	Ziegler Chemical Co.	0	Asphalt	0	Naptha	0		P	1	0
05/27/85	VENTURA	CA	Unknown	0	Atrazine	0	Triazole	0		T	3	0
01/16/85	LOS ANGELES	CA	Rocket-Dyne	0	Azidodinitroethane	0		0		P	4	0
06/25/84	ELDERTON	PA	Chem Leaman Tankline Inc.	0	Benzene	0		0		T	1	0
01/27/83	MIDLAND	TX	Unknown	0	Benzene	0		0		T	1	0
06/20/83	BATON ROUGE	LA	Exxon USA	300	Benzene	0		0		P	1	0
09/20/84	SUNNY VALE	CA	Unknown	225	Benzyl Bromoacetate	0		0		P	1	0
08/17/84	FLEMINGTON	NJ	Penn-Color Warehouse	0	Bromochloroethane	0	Benzene	0		P	0	0
04/15/82	NIMISHALA TWP.	OH	Eslich Wrecking Co.	0	Butadiene	0		0		P	1	0
08/07/80	HOUSTON	TX	Unknown	0	Butadiene	0		0		T	5	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
01/13/84	HILLSBROUGH	NJ	Lehn and Fink	0	Butane	0		0		P	4	0
12/26/80	BROUSSARD	LA	Unknown	3750	Butane	0		0		P	3	0
12/01/84	RAHWAY	NJ	Ritter Transportation	0	Butane Mercaptan	0		0		T	2	0
09/11/84	AZUSA	CA	Unknown	5000	Butyl Acetate	0		0		P	4	0
10/01/83	MOBILE	AL	Commercial Industrial Chemical	0	Calcium Chlorine	0	Sodium	0	Metabisulfate	T	1	0
11/26/80	MENDOTA	CA	Unknown	38	Carbolic Acid	0	Gasoline	0		T	0	1
01/11/84	RIDGEVILLE	SC	SC Electric and Gas Co.	0	Carbon Dioxide	0		0		P	4	0
11/15/82	AKRON	OH	Goodyear Tire and Rubber	3000	Carbon Disulfide	0		0		P	8	0
07/18/81	NEW ORLEANS	LA	Unknown	825	Carbon Disulfide	0		0		T	1	0
08/24/84	FILLMORE	CA	Unknown	1000	Carboxin	0	Thiram	0		T	2	0
02/18/82	DAYTON	OH	Mark Exterminating	750	Chlordane	0		0		P	8	0
05/13/83	CAMDEN	NJ	Unknown	0	Chlordane	0		0		P	1	0
01/13/83	EL DORADO	AR	Ensco Inc.	1350000	Chlorinated Hydrocarbons	0		0		P	1	0
10/22/84	SAN JOSE	CA	Raisch Construction Co.	413	Chlorinated Rubber Chromate	0		0		P	2	0
11/22/83	INDIANAPOLIS	IN	Detrex Chemicals	7500	Chlorinated Solvents	0		0		T	1	0
02/18/85	LAKE CO	OH	CALHIO Chemical	113	Chlorine	0		0		P	1	0
10/26/83	MANSFIELD	OH	Jim Cousins Inc.	200	Chlorine	0		0		P	2	0
04/11/85	UNION BEACH	NJ	IFF International	0	Chlorine	0		0		P	1	0
11/28/84	AGOURA	CA	Unknown	150	Chlorine	0		0		P	7	0
10/14/83	FT. WAYNE	IN	Jones Chemicals Inc.	1000	Chlorine	0		0		P	6	0
11/15/83	DEER PARK	TX	Shell Oil Co.	1000	Chlorine	0		0		P	2	0
11/21/83	CLEVELAND	OH	Clorox Co.	78	Chlorine	0		0		P	2	0
12/21/83	TACOMA	WA	Penwalt Corp.	25	Chlorine	0		0		P	2	0
12/23/83	ST. GABRIEL	LA	Stauffer Chem.	3000	Chlorine	0		0		P	12	0
02/24/84	NITRO	WV	Monsanto Co.	0	Chlorine	0		0		P	8	0
03/09/84	COMMERCE CITY	CO	Dixie Petro-Chem Inc.	30	Chlorine	0		0		P	1	0
03/23/84	LONGVIEW	TX	Dixie Petrochem Co.	175	Chlorine	0		0		P	1	0
05/02/84	OAKLAND	CA	Olympic Chemical	0	Chlorine	0		0		P	2	0
05/02/84	OAKLAND	CA	Schnitzer Steel Co.	188	Chlorine	0		0		P	25	0
05/27/84	TAMPA	FL	McKesson Chemical Co.	0	Chlorine	0		0		P	2	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
06/08/84	NIAGRA FALLS	NY	Occidental Chemical Co.	0	Chlorine	0		0		P	3	0
03/01/83	CHARLESTON	WV	FMA Corp.	225	Chlorine	0		0		P	3	1
03/08/83	CHICKAMUGA PARK	GA	PBS Chemical	1	Chlorine	0		0		T	1	0
03/11/83	LAKE CHARLES	LA	PPG Industries	0	Chlorine	0		0		P	4	0
04/22/83	FREEPORT	TX	Dow Chemical	0	Chlorine	0		0		P	2	0
08/08/83	GEISMAR	LA	Borden Chemical	1000	Chlorine	0		0		P	0	0
08/11/83	LONGVIEW	TX	Texas Eastman Co.	250	Chlorine	0		0		P	1	0
09/07/83	MILPETAS	CA	Jones Chemicals	50	Chlorine	0		0		P	1	0
08/07/84	BATON ROUGE	LA	Allied Chemical Corp.	500	Chlorine	0		0		P	2	0
10/30/84	UNION CITY	CA	Unknown	25	Chlorine	0		0		P	1	0
11/02/84	SAN JOSE	CA	Printed Circuit Technology	5	Chlorine	0		0		P	4	0
02/18/84	RAHWAY	NJ	Rahway Sewage Authority	1500	Chlorine	0		0		P	1	0
06/14/84			Morristown Sewage Treatment Plant	0	Chlorine	0	Hydrochloric Acid	0	Calcium Hypochlorite	P	1	0
10/29/84	EASTOVER	SC	Union Camp Corp.	500	Chlorine	0		0		P	11	0
11/08/84	AXIS	AL	Stauffer Chemical	1000	Chlorine	0		0		P	1	0
04/09/83	KNOXVILLE	TN	Kuwahee Sewage Treatment	0	Chlorine	0	Hypochlorite	0	Ferric Chloride	P	4	0
06/01/81	GEISMAR	LA	BASF Wyandotte Corp.	0	Chlorine	0		0		P	140	0
05/13/85	ASHLAND	AL	Spring Valley Poultry Processing	0	Chlorine	0		0		P	27	0
04/10/82	BELLE	WV	Diamond Shamrock Corp.	0	Chlorine	0		0		P	11	0
10/31/82	NIAGARA FALLS	NY	E.I. DuPont de Nemours and Co.	2000	Chlorine	0		0		P	76	1
10/26/83	HENDERSON	NV	Jones Chemical Co.	2000	Chlorine	0		0		P	3	0
06/06/84	INDEPENDENCE	MO	Unknown	0	Chlorine	0	Calcium Hypochlorite	0	Naptha	T	1	0
08/07/84	OMAHA	NE	Asarco Inc.	320	Chlorine	0		0		P	2	0
02/29/84	RICHMOND	VA	AT&T Tech Systems	0	Chlorine	0		0		P	2	0
01/21/84	SOMERSET COUNTY	ME	Fd. Warren Co.	100	Chlorine	0		0		P	3	0
09/03/83	BIRMINGHAM	AL	Southern Railway	0	Chlorine	0		0		T	1	0
09/08/83	HENDERSON	KY	PBS Chemical	150	Chlorine	0		0		P	2	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
04/16/84	SANTA BARBARA	CA	Unknown	0	Chloropicrin	0		0		T	1	0
07/11/83	LAPLACE	LA	E.I. DuPont de Nemours and Co.	0	Chloroprene	0		0		P	21	0
06/13/84	TWINSBURG	OH	Peters Supply Co.	550	Chromic Acid	55	Potassium Ferricyanide	55	Potassium Ferrocyanide	P	2	0
03/30/83	STATE COLLEGE	PA	Roadway Express	263	Cleaning Compound	0		0		T	1	0
08/16/84	CLEVELAND	OH	Mobile Tank Car Services	0	Coal Tar	0	Light Oil	0		T	21	2
03/23/83	MANSFIELD	OH	Synder Transport	0	Coal Tar Dye	0		0		T	1	0
11/18/83	KENT	WA	Bower Transportation	0	Corrosive Material	0		0		T	1	0
05/22/81	CHICAGO	IL	Clipper Express Co.	413	Cresylic Acid	0		0		P	28	0
08/26/81	GOOD HOPE	LA	GATX Terminals	0	Crude Oil	0		0		P	1	0
07/08/77	FAIRBANKS	AK	Unknown	0	Crude Oil	0		0		T	6	1
04/19/85	NORCO	LA	Shell Oil Co.	0	Crude Oil	0		0		P	9	0
06/29/84	BRIDGEPORT	CA	Unknown	563	Cyanide	0		0		T	1	0
01/09/81	LOS ANGELES	CA	Mendelson and Assoc.	0	Cyanide	0		0		P	19	0
11/16/83	LATEX	LA	Kansas City - Southern Railroad	52500	Cypernethren	0	Diesel Fuel	0		T	6	0
07/06/83	GEISMAR	LA	Keystone Shipping	2053	Dichloromethane	0		0		P	[illegible]	0
07/03/84	INDUSTRY	CA	Unknown	413	Dicyamideamine	0		0		P	2	0
08/31/84	SANGER	TX	Unknown	0	Diethylamine	0	Antimony Trioxide	0		T	11	0
07/07/81	BOGALUSA	LA	Crown Zellerbach Paper and Chemical Corp.	0	Dimethyl Sulfoxide	0		0		P	3	0
10/12/84	JACKSON TOWNSHIP	OH	McLean Trucking Co.	413	Dimethylamine	0		0		T	5	0
06/21/83	MIDDLEBURG	CT	1-Call Motor Freight	10	Dimethylamine	0		0		T	1	0
06/19/84	CRANBERRY TWP.	NJ	Cordoba Helicopter Enterprises Inc.	0	Endosulfan	0	Pydrin	0		T	1	0
07/21/83	MT. PLEASANT	PA	Matlack Inc.	150	Epoxy Resin	0		0		T	1	0
06/17/85	HOPEWELL	NJ	American Surfacing Co. Inc.	0	Ethyl Acetate	0	Polyurethane Binder	0		P	0	1
03/15/84	WALLRIDGE	OH	Coastal Tank Lines	113	Ethyl Acrylate	0		0		P	1	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
09/30/83	LINCOLN	IN	Liquid Transportation	1	Ethyl Acrylate	0		0		T	1	0
09/12/83	S. HACKENSACK	NJ	Dr. Madis Laboritories, Inc.	0	Ethyl Alcohol	0		0		P	7	0
06/09/81	FT. MADISON	IA	Chevron Chemical Co.	7500	Ethylamine	0		0		P	1	1
10/13/81	FREEPORT	TX	Dow Chemical Co.	0	Ethylene	0	Polyethylene	0		P	7	6
11/12/82	IRVINE	CA	Bentley Labs	0	Ethylene Oxide	0	Freon	0		P	77	0
02/09/80	WALNUT RIDGE	AR	Unknown	0	Ethylene Oxide	0	Ethylene Chloride	0	Vinyl Chloride	T	1	0
07/30/81	GRANTSVILLE	VT	Mining Services International	0	Explosives	0		0		P	0	5
05/27/83	BENTON	TN	Webb Bait Farm	0	Explosives	0		0		P	1	11
11/26/83	BALLPORT	NY	New York Pyrotechnic Inc.	0	Explosives	0		0		P	23	2
03/01/84	PROMONTORY	UT	Morton-Thiokol Corp.	0	Explosives	0		0		P	14	0
04/25/83	CHEBANSE	IL	Amoco Oil Co., Fertilizer Division	142500	Fertilizer	50	Anhydrous Ammonia	0		P	4	0
09/03/80	ORANGE	CA	Robinson Fertilizer Co.	0	Fertilizer	0	Pesticide	0		P	2	0
04/22/80	FORT HALL INDIAN RES	ID	Russett Chemical Co.	0	Fertilizer	0	Pesticides	0		P	29	0
06/15/83	CENTERVILLE	VA	Unknown	8250	Fertilizer	0		0		T	1	0
06/25/85	HALLETT	OK	Aerlex Fireworks Co.	0	Fireworks	0		0		P	0	0
11/24/84	ADAMS	MA	Adams Paint Works	0	Flammable Chemicals	0		0		P	0	0
11/25/80	KENNER	LA	Mobil Oil Co.	0	Flammable Liquid	0		0		T	2	7
02/12/83	ALBUQUERQUE	NM	Road Way Express	63	Flammable Liquid	0		0		T	5	0
06/30/84	ELLENWOOD	GA	Consolidated Freightways	0	Flammable Material	0		0		P	2	0
09/13/84	LACEY	WA	Chemical Waste Management	0	Flue Dust	0		0		T	1	0
09/06/84	MONTEREY	CA	Unknown	37710	Formaldehyde	0		0		T	1	0
08/11/83	HOUSTON	TX	Unknown	0	Formaldehyde	0		0		T	1	0
08/10/84	LINDWOOD	NJ	Unknown	0	Freon	0		0		P	10	0
09/05/84	ANTHONY	KS	Farmers Oil Co.	0	Fuel	0		0		P	3	2
07/18/76	BIG SPRING	TX	Unknown	0	Fuel Oil	0		0		P	10	0
01/20/80	BORGER	TX	Phillips Petroleum	0	Fuel Oil	0	Crude Oil	0		P	40	0
09/01/83	CHALMETTE	LA	Tenneco Oil Refinery	900000	Gasoline	0		0		P	24	1

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
12/03/79	TORRANCE	CA	Mobil Oil	0	Gasoline	0	Butane	0		P	0	3
08/11/80	ELYSIAN PARK	CA	Unknown	0	Gasoline	0		0		T	1	0
06/23/84	HIALEAH	FL	Unknown	60000	Gasoline	0		0		T	0	1
08/14/80	MORGAN CITY	LA	Texaco Oil Co.	0	Gasoline	0	Diesel Fuel	0		P	10	0
08/23/80	MADISONVILLE	LA	Stokes Oil Co.	0	Gasoline	0		0		P	1	1
09/07/80	ALBANY	NY	Mobil Oil Corp.	0	Gasoline	0		0		P	10	0
08/15/80	HONOLULU	HI	Shell Oil Co	0	Gasoline	0		0		P	2	0
11/14/81	CANON CITY	CO	Unknown	0	Gasoline	0		0		T	6	7
08/27/80	CHICAGO	IL	Illinois Warehouse Corp.	0	Hazardous Waste	0		0		P	7	0
09/14/83	EAST LOS ANGELES	CA	Unknown	340000	Hazardous Waste	0		0		T	3	0
01/01/82	CANTON	OH	Canton Park Dept.	0	Herbicide	0		0		T	0	0
04/11/85	RUPERT	ID	Unknown	0	Herbicide	0		0		T	10	0
08/31/83	NOLA	LA	Unknown	0	Hexachlorocyclopentadiene	0		0		P	3	0
01/21/85	WALL TOWNSHIP	NJ	Selective Coatings Inc.	0	Hexane	0	Isopropyl Acetate	0	Toluene	T	1	0
07/28/83	SANBORN	IA	Dahleen Transportation	0	Hexane	0		0		T	2	1
02/13/81	LOUISVILLE	KY	Ralston Purina	1125	Hexane	0		0		P	4	0
05/10/84	PEABODY	MA	Henry Leather Co.	0	Hydrocarbons	0	Benzene	0	Lacquer	P	125	1
08/24/83	SCOTT CO.	IA	Thompson Hayward	375	Hydrochloric Acid	0		0		T	2	0
06/28/84	BEAUMONT	TX	Mobil Chemical	11250	Hydrochloric Acid	0		0		P	1	0
03/10/83	MILWAUKEE	WI	Hercules Inc.	0	Hydrochloric Acid	0		0		P	1	0
10/02/84	ONTARIO	CA	United Parcel Service	8	Hydrochloric Acid	0		0		T	7	0
07/12/84	EL TORO	CA	Unknown	263	Hydrochloric Acid	0		0		T	19	0
07/23/84	RIVERSIDE	NJ	Riverside Metals Co.	0	Hydrochloric Acid	0	Acetone	0		P	0	0
11/20/81	RESERVE	LA	Jones Chemical	6000	Hydrochloric Acid	0		0		P	2	0
12/11/83	BURBANK	CA	Andrew Jergens Co.	0	Hydrochloric Acid	0		0		P	3	0
02/17/81	HUNTINGTON PARK	CA	Cyclo Chemical	0	Hydrochloric Acid	0		0		P	80	0
04/27/81	FONTANA	CA	Unknown	0	Hydrochloric Acid	0		0		T	21	0
06/01/84	RIVERSIDE	CA	Culligan Water Co.	1500	Hydrochloric Acid	0		0		P	4	0
05/24/85	EASTLAND	TX	Missouri Pacific Railroad	0	Hydrochloric Acid	0	Anhydrous Hydrogen	0	Sulfuric Acid	T	15	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
05/02/80	WOODS CROSS	VT	Phillips Petroleum	0	Hydrochloric Acid	0	Crude Oil	0	Gasoline	P	8	0
08/18/82	ELIZABETH	NJ	L.J. & M La Place Industrial Chem.	37500	Hydrochloric Acid	0		0		T	32	0
01/12/84	MILPITAS	CA	Arrowhead Industrial Waters	113	Hydrochloric Acid	0		0		P	1	0
02/12/84	TRICE	UT	Unknown	23000	Hydrochloric Acid	0		0		T	1	0
04/09/84	MULLINS	WV	B.J. Huges Services	2300	Hydrochloric Acid	0		0		T	1	0
03/09/83	BEAUMONT	TX	Transport Company of Texas	45375	Hydrochloric Acid	0		0		T	2	0
07/05/83	MOB	NM	BJ - Hughes Service	37450	Hydrochloric Acid	0		0		T	1	0
08/01/83	IRVINE	CA	Unknown	15	Hydrochloric Acid	0		0		T	3	0
04/12/83	CLEVELAND	OH	Alchem-tron Inc.	0	Hydrofluoric Acid	0	Nitric Acid	0	Lime	P	1	0
02/01/84		NJ	Hercules Powder Plant	0	Hydrogen	0		0		P	0	0
11/11/82	WESTLAKE	LA	Olin Corp	0	Hydrogen	0		0		P	1	0
03/25/84	RAHWAY	NJ	Unique Precision Metals	0	Hydrogen Cyanide	0		0		P	5	0
02/05/85	ELKHART	IN	Conrail Railroad	0	Hydrogen Fluoride	0		0		T	0	0
01/23/83	CUMBERLAND	MD	Chessie Systems Railroad	0	Hydrogen Sulfide	0		0		T	4	0
04/15/84	MIDLAND	TX	Unknown	0	Hydrogen Sulfide	0		0		P	6	0
01/08/84	RICHMOND	CA	Chevron USA Inc.	38	Hydrogen Sulfide	38	Ammonia	0		P	78	0
01/13/82	UTICA	MI	Liquid Disposal Corp.	0	Hydrogen Sulfide	0		0		P	15	2
07/06/85	COMANCHE	IA	Hawkeye Chemical	0	Hydrogen/Nitrogen	0		0		P	7	0
08/20/84	INDIANAPOLIS	IN	C.R.S.T INC.	75	Insecticide	0		0		T	1	0
05/09/84	FREEMONT	CA	Unknown	750	Insecticide	0		0		T	2	0
02/21/85	ELIZABETH	NJ	N.Y. Bronze Powder Corp.	0	Isobutane	0	Phosgene	0	Hydrochloric Acid	P	19	0
07/27/84	BETHLEHEM	PA	Joseph Ayers Co.	0	Isopropyl Alcohol	0	Hydrocarbons	0		P	3	1
07/31/84	ARLINGTON	VA	Unknown	1700	Kelthane 35	1700	Melathyone	0		T	1	0
07/24/80	QUEENS	NY	Unknown	0	Lacquer	0		0		P	40	4
08/23/83	ROBINS	GA	Brown Transport	90	Lacquer	0		0		T	3	0
12/08/83	OWATONNA	MN	General Battery Corp.	0	Lead Acid Batteries	0		0		T	1	0
05/30/78	TEXAS CITY	TX	Unknown	0	Light Hydrocarbons	0	Hydrocarbons	0		P	10	5
02/04/82	SALEM	OH	Dow Chemical	0	Liquid Nitrogen	0		0		T	1	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
10/16/84	SAN CARLOS	CA	Liquid Carbonics	25	Lithium Hydride	0		0		P	1	0
06/11/84	ST LOUIS	MO	Monsanto	27500	M-Xylene	0		0		P	2	0
12/20/83	EAST CAMDEN	AR	Tracor-MBA	0	Magnesium	0		0		P	21	1
10/06/84	LINDEN	NJ	American Cyanamid and Chemical Co.	0	Malathion	0		0		P	161	0
06/27/85	THERMAL	CA	Wilbur Ellis Co.	0	Malathion	0	Paraquat	0	Methyl Bromide	P	90	0
06/07/84	ST. LOUIS	MO	Slay Transport	0	Maleic Anhydride	0		0		P	1	1
08/01/84	MIAMI TOWNSHIP	OH	Gulf Oil	0	Mercaptan	0		0		P	1	0
07/21/83	BEACON FALLS	PA	Chippewa Township Sewage Treatment	0	Methane	0	Chlorine	0		P	9	2
02/02/82	LIMA	OH	Vistron	0	Methyl Acrylate	0	Acrylonitrile	0		P	1	1
12/22/82	VERNON	CA	Unknown	413	Methyl Acrylate	0		0		P	355	0
03/22/85	BROOKLYN PARK	MD	Matlack Inc.	750	Methyl Acrylate	0		0		P	20	0
12/11/84	REED SPRINGS	MO	Rantzels	0	Methyl Alcohol	0	Toluene	0	Cyanide	P	12	0
09/17/84	LOCKPORT	LA	X-Chem Inc.	55500	Methyl Alcohol	0		0		T	2	0
10/03/83	HOUSTON	TX	J. Chemical Co.	30000	Methyl Bromide	0	Malathion	0		P	5	2
06/24/85	ANAHEIM	CA	Larry Fricken Co.	0	Methyl Bromide	0	Organophosphates	0	Ammonium Nitrate	P	12	0
07/28/83	NEW YORK	NY	Greenburg Associates	30	Methyl Chloroform	0		0		P	31	0
11/19/82	HAMILTON CO.	OH	Ohio Valley Graphic Ink Co.	0	Methyl Ethyl Ketone	0		0		P	0	1
04/19/85	DOVER	NJ	J.C. Curtis	0	Methyl Ethyl Ketone	0	Phosgene	0	Hydrogen Cyanide	P	80	0
01/27/83	PASADENA	TX	Celanese Chemical Co.	50	Methyl Iodide	0		0		P	2	0
11/15/84	MIDDLEPORT	NY	FMC Corp.	0	Methyl Isocyanate	0		0		P	110	0
06/01/84	BARBERTON	OH	PPG Industries	0	Methyl Mercaptan	0		0		P	0	0
05/30/85	CARLSTADT	NJ	610 Plastic Corp.	0	Methyl Methacrylate	0		0		P	5	0
06/13/83	SOUTH HACKENSACK	NJ	Caloric Chemical	413	Methyl Methacrylate	0		0		P	4	0
04/25/85	SANTA ANA	CA	Unknown	188	Methylene Chloride	0		0		P	2	0
06/03/81	MILLFORD	CT	Connecticut Aerosols	0	Methylene Chloride	0		0		P	30	0
03/09/83	METIRIE	LA	Shell Oil Co.	0	Methylmercaptan	0		0		P	1	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
08/03/84	IRVINE	CA	Unknown	19	Monoethanolamine	0		0		T	9	0
10/08/84	EL CENTRO	CA	Unknown	188	Morphine	0		0		T	5	0
04/05/85	MYRTLE BEACH	SC	Arnold's Pool Service	24375	Muriatic Acid	24375	Sodium Hydrochloric Acid	0		P	10	0
10/20/83	BOCA RATON	FL	Unknown	0	Muriatic Acid	1500	Hydrochloric Acid	0		P	2	0
0[illegible]/25/84	FLINT	MI	Buick Div. of GM	563	Nalco 324	0		0		P	1	0
06/07/83	BATON ROUGE	LA	Unknown	0	Naphtha	0		0		T	2	0
09/03/81	MARRERO	LA	Celotex Corp.	0	Naphtha Asphalt	0		0		P	13	1
07/07/84	VICTORVILLE	CA	Unknown	188	Nitric Acid	0		0		T	1	0
04/04/83	DENVER	CO	Denver and Rio Grande Western Railroad	150000	Nitric Acid	0		0		T	8	0
06/02/82	GULFPORT	MS	Plastifax Corp.	0	Nitric Acid	0		0		P	61	3
07/22/83	N. KANSAS CITY	MO	Exhibitors Film Delivery	8	Nitric Acid	0		0		T	16	0
03/25/84	GEISMAR	LA	Rubicon Chemical Co.	8	Nitric Acid	0		0		P	1	0
07/19/83	WESTLAKE	LA	Matlack Inc.	150	Nitric Acid	0		0		P	1	0
02/21/85	SAYREVILLE	NJ	Hercules Powder Plant	0	Nitrocellulose	0		0		P	5	1
11/29/83	SAYREVILLE	NJ	Hercules Inc.	100	Nitrocellulose	0	Ethyl Alcohol	0		P	5	0
03/16/84	RICHMOND	RI	Carol Products Co.	0	Nitrogen	0	Hydrochloric Acid	0	Sulfuric Dioxide	P	35	0
01/16/85	MELBOURNE	IA	Iowa River Farm Service	21750	Nitrogen Fertilizer	0		0		P	1	0
09/02/83	EAST LOS ANGELES	CA	Unknown	3000	Nitrogen Fertilizer	0		0		T	4	0
05/13/82	COLUMBUS	OH	G.F. Smith Chemical	0	Nitrous Oxide	0		0		P	0	0
05/19/82	COLUMBUS	OH	G.F. Smith Chemical Co.	0	Nitrous Oxide	0		0		P	0	0
06/11/81	GREENSBURG	PA	Conrail Railroad	0	Octyl Alcohol	0		0		T	68	0
08/04/81			Amerada Hess Corp.	0	Oil	0		0		P	5	0
04/03/83	ST. LOUIS	MO	Valley Touring Service	75000	Oil	0	Monochlorobenzene	0		T	1	0
11/14/83	EAST CHICAGO	IL	American Recovery	0	Oil	0		0		P	1	0
02/06/81	TERREBONNE PARISH	LA	Union Texas Petroleum	0	Oil	0		0		P	0	3

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
07/21/83	ELIZABETH	NJ	Port Authority Terminal	0	Ortho-Nitrochlorobenzene	0		0		T	10	0
03/20/84	AMELIA	OH	A Ichemtron / CECOS	13000	Oxidizers	0		0		P	1	0
08/03/80	VAN NUYS	CA	Oxy Med	0	Oxygen	0		0		P	1	3
01/11/83	ATLANTA	GA	Yellow Freight Systems	413	Paint	0		0		T	1	0
06/18/83	LURAY	VA	Distribution Service System	0	Paint	0		0		T	1	0
01/24/84		CA	Unknown	4	Parathion	0		0		T	1	0
06/20/84	HAMILTON TWP.	NJ	Hess Construction	0	Pentachlorophenol	0		0		P	24	0
07/22/80	ST. BERNARD PARISH	LA	Unknown	25000	Pentachlorophenol	0	Hydrobromic Acid	0		T	2	0
05/04/84	SOUTH AMBOY	NJ	Conrail Railroad	750	Pentane	0		0		T	3	0
11/23/84	CANOGA PARK	CA	Unknown	188	Perchloric Acid	0		0		P	1	0
03/31/83	KILGORE	TX	Empak Transportation	0	Peroxide	0		0		T	1	0
07/14/84	BAKERSFIELD	CA	Unknown	75	Pesticide	0		0		T	1	0
06/13/85	WILLIAMSBURG	MI	Unknown	16000	Pesticide	1080	Paraquat	750	Parathion	T	24	0
07/16/84	ORISKA	ND	Dakota Helicopter	2000	Pesticide	0		0		T	1	0
12/04/83	HIGHLANDS	TX	Hi-Port Industries	0	Petroleum Products	0		0		P	4	0
12/06/83	HUNTVILLE	TX	Chem Leaman Tankline Co.	22500	Phenol	0		0		T	1	0
01/27/84	FORT LAUDERDALE	FL	USCG MSO Tampa	0	Phenol Mercury Acetate	0		0		P	1	0
11/12/84	LAPORTE	TX	Upjohn Co.	5000	Phosgene	3000	Monochlorobenzene	0		P	2	0
06/03/81	GEISMAR	LA	BASF Wyandotte Corp.	0	Phosgene	0		0		P	15	0
03/03/80	LOCKPORT	NY	Twin Lake Chemical	1800	Phosgene	0		0		P	7	1
06/02/82	WESTLAKE	LA	Olin Chemical	0	Phosgene	0		0		P	60	1
12/26/84	KANSAS CITY	MO	General Mill	0	Phosphine	0		0		P	3	0
09/20/84	BARSTOW	CA	Unknown	1875	Phosphoric Acid	0		0		T	1	0
05/16/85	SEATTLE	WA	Rainier Brewery	0	Phosphoric Acid	0	Chlorine Bleach	0		P	5	0
01/05/84	GADSDEN	AL	Schwerman Trucking Co.	50	Phosphoric Acid	0		0		T	12	0
04/03/80	SOMERVILLE	MA	Unknown	97500	Phosphoric Trichloride	0	Hydrochloric Acid	0	Phosphoric Acid	T	343	0
04/14/83	CASA GRANDE	AZ	Southern Pacific Trans. Co.	0	Phosphorus	0		0		T	4	1

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
01/22/84	SAUGET	IL	Monsanto	45000	Phosphorus Oxychloride	0		0		P	125	0
10/17/83	CHARLESTON	SC	Chemical Leaman Tanklines	13000	Phosphorus Oxychloride	0		0		P	1	0
06/07/84	ST. LOUIS	MO	US Polymer Corp.	0	Phthalic Anhydride	0		0		P	2	0
12/13/84	CARPENTERSVILLE	IL	Cargill Inc.	0	Phthalic Anhydride	0		0		P	7	0
03/26/84	PITTSBURGH	PA	US Steel Corp.	100000	Phthalic Anhydride	0		0		P	1	0
10/06/82	COLUMBUS	OH	C and SOE Co.	60	Polychlorinated Biphenyls	0		0		P	0	0
01/29/84	JACKSONVILLE	FL	American Electric Co.	15000	Polychlorinated Biphenyls	0	Oil	0		P	2	0
08/13/84	PORTLAND	OR	Unknown	98	Polychlorinated Biphenyls	0		0		T	1	0
11/01/83	MILWAUKEE	WI	WI Electric Power Co.	8	Polychlorinated Biphenyls	0		0		P	1	0
09/17/84	LIVONIA	MI	Ford Motor Co.	0	Polychlorinated Biphenyls	0		0		P	6	0
02/29/84	CHARLOTTE	NC	Winn Dixie	38	Polychlorinated Biphenyls	0		0		P	8	0
03/21/84	WELLSTON	OH	Genos	1500	Polychlorinated Biphenyls	0		0		P	2	0
03/20/84	SPRING CITY	TN	Westinghouse	0	Polychlorinated Biphenyls	0		0		P	2	0
03/01/83	NEWPORT	DE	Dupont Union	0	Polychlorinated Biphenyls	0		0		P	5	0
05/01/83	FLAGSTAFF	AZ	Unknown	20	Polychlorinated Biphenyls	0		0		T	2	0
06/15/83	MIAMI	FL	Florida Screen Ent. Inc.	20	Polychlorinated Biphenyls	0		0		P	1	0
07/02/83	CHICAGO	IL	Commonwealth Edison	135	Polychlorinated Biphenyls	0		0		P	1	0
09/26/83	HACKLEBURG	AL	Unknown	0	Polychlorinated Biphenyls	0		0		T	1	0
08/23/83	NEWARK	NJ	P. D. Plastics	0	Polyethylene	0	Polypropylene	0	Acrylonitrile	P	0	0
10/17/83	BEDFORD	PA	Matlack Inc.	0	Polymeric Diphenol	0	Methane Diisocyanate	0		T	1	0
10/12/84	RIDGEWOOD	KY	Unknown	0	Polystyrene	0		0		T	1	0
03/21/85	PLAINFIELD	NJ	Oliver Brown Trucking	0	Polyvinyl Chloride	0		0		P	90	1
03/05/84	JERSEY CITY	NJ	Fabric Chemical Corp.	0	Potassium Hydroxide	0	Sodium Hypochlorite	0	Acetic Acid	P	0	0
07/09/84	RANKING	TX	Unknown	0	Propane	0		0		T	3	0
10/03/78	DENVER	CO	Unknown	0	Propane	0		0		P	1	3
03/20/79	LINDEN	NJ	Exxon Co.	0	Propane	0	Butane	0	Hydrocarbons	P	6	0
04/20/84	WANATAH	IN	Grand Truck Western Railroad	0	Propane	0		0		T	8	0
05/26/81	ARTESIA	NM	Navajo Refinery Co.	0	Propane	0	Butane	0		P	17	0
08/20/83	MOBILE	AL	Southern Railroad	0	Propyl Mercaptan	0		0		T	3	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
10/21/80	NEW CASTLE	DE	Unknown	14000	Propylene	0	Polypropylene	0		P	12	6
11/05/81	CASTAIC	CA	Unknown	15000	Propylene Dichloride	0		0		T	100	0
08/03/83	NEWARK	OH	Owen Corning Fiberglass	7500	Propylene Oxide	0		0		P	11	0
02/02/85	LONG BRANCH	NJ	Unknown	0	Pyrethrin	0		0		P	0	0
11/08/83	MONTPELIER	OH	Rogers Cartage Co.	0	Resin	0		0		T	1	0
08/31/83	MONTICELLO	IN	Matlack Inc.	75	Silicate of Soda	0		0		P	1	0
08/22/81	SAN FRANCISCO	CA	M & T Chemicals	10000	Silicon Tetrachloride	0		0		P	28	0
09/19/83	ALAMOGORDO	NM	Drexel Chemical Co.	12000	Sodium Chlorite	6000	Urea	0		T	0	2
06/07/83	GROVEVILLE	NJ	Unknown	0	Sodium Hydrosulfate	0	Sodium Hydroxide	0		P	1	0
09/13/82	CHARLOTTE	NC	Unknown	0	Sodium Hydrosulfide	0	Paraquat	0		P	29	0
08/10/83	ATLANTA	GA	Unknown	0	Sodium Hydrosulfite	0		0		T	16	0
07/20/84	TEXARKANA	TX	International Paper	100	Sodium Hydroxide	0		0		P	1	1
07/10/84	TILTON	IL	Norfolk & Western Railway	0	Sodium Hydroxide	0		0		T	1	0
01/20/84	MANSFIELD	LA	International Paper	300	Sodium Hydroxide	0		0		P	1	0
03/19/84	E. CHICAGO	IN	J & L Steel Co.	38	Sodium Hydroxide	0		0		P	2	0
04/21/83	ELKHART	IN	Matlack Inc.	188	Sodium Hydroxide	0		0		T	1	0
04/27/83	PARKERSBURG	WV	Chessie Systems Railroad	15	Sodium Hydroxide	0		0		T	1	0
07/06/83	CHICAGO	IL	Morgan Services	75	Sodium Hydroxide	0		0		P	1	0
08/18/83	ST. MARYS	GA	Fleet Transport Co.	0	Sodium Hydroxide	0		0		T	1	0
10/17/84	WATERBURY	CT	Hampton Color and Chemical Co	2250	Sodium Hypochlorite	0		0		P	1	0
08/28/83	DONEGAL	PA	Unknown	41000	Sodium Nitrate	0		0		T	10	4
08/18/83	DOVER	DE	CFE Air Cargo	100	Sodium Nitrate	0		0		P	1	0
04/30/85	GOOSE CREEK	SC	Mobay Chemical Corp.	0	Sodium Sulfhydrate	0		0		P	5	1
05/25/84	DAYTON	OH	CPS Delivery	38	Solvent	0		0		T	1	0
12/20/84	AKRON	OH	Recycle Energy	0	Solvent	0		0		P	7	3
04/03/84	BAILEYS CROSSROADS	VA	Trans Circuits	0	Solvent	0	Acid	0		P	18	0
06/21/84	KANSAS CITY	KS	Old Theatre Architectural Salvage Co.	0	Solvent	0		0		P	7	0
06/01/84	YREKA	CA	Trans AM Div of Schnieder Nat'l.	375	Solvent	0		0		T	1	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
02/07/83	GRAPEVILLE	CA	Unknown	26250	Solvents/Corrosives	0		0		T	0	0
08/22/84	FREEDOM	PA	Ashland Petroleum Co.	0	Specialty Oils	0		0		P	1	2
04/29/82	CANFIELD	OH	Polysar Inc.	4500	Styrene	0		0		T	3	0
11/30/82	ORANGE	CA	Casden Oil and Chemical	45000	Styrene	0		0		P	0	0
04/13/80	MCNEILL	MS	Unknown	0	Styrene	0	Crude Oil	0	Diesel Fuel	T	2	0
04/24/80	BAYONNE	NJ	ICI Americas	0	Styrene	0	Toluene Diisocyanate	0		P	5	0
11/16/84	PORTER	DE	Conrail	1	Styrene	0		0		T	1	0
08/25/83	MONACA	PA	Arco	0	Styrene	0		0		P	1	0
01/19/85		CA	Unknown	60000	Sulfur	0		0		T	7	2
10/30/81	BERKLEY	MO	McKesson Chemical Co.	150	Sulfur Dioxide	0		0		P	0	0
01/21/81	ELIZABETH	NJ	Allied Chemical Corp.	0	Sulfur Trioxide	0		0		P	70	0
09/08/84	BAKERSFIELD	CA	Unknown	563	Sulfuric Acid	0		0		T	1	0
10/02/82	KANSAS CITY	KS	Union Pacific Railroad	0	Sulfuric Acid	0		0		T	2	0
09/22/83	SALISBURY	NC	National Starch and Chemical	0	Sulfuric Acid	0		0		P	22	0
03/30/84	EAST SYRACUSE	NY	United Parcel Service	10	Sulfuric Acid	0		0		T	40	0
05/15/80	DEPUE	IL	Mobil Chemical Oil	7500	Sulfuric Acid	0	Hydrogen Sulfide	0		P	1	1
05/14/84	SANTA BARBARA	CA	Reaghem's Vacuum Truck Service	0	Sulfuric Acid	0	Ammonia Sulfate	0	Copper Sulfate	T	3	0
12/13/84	ELKRIDGE	MD	Chesapeake Finished Metals Co.	0	Sulfuric Acid	0		0		P	0	2
11/03/83	MIDLAND	MI	Dow Chem. Co	7665	Sulfuric Acid	0		0		P	1	0
11/10/83	CASPER	WY	Burlington Northern Railroad	450	Sulfuric Acid	0		0		T	1	0
09/26/84	MEMPHIS	TN	Thompson Hayward Chemical	150	Sulfuric Acid	0		0		P	1	0
10/11/84	PORTAGEVILLE	TN	Thompson Hayward Chemical	2	Sulfuric Acid	0		0		P	1	0
11/05/84	BARTON	FL	W.R. Grace and Co.	1	Sulfuric Acid	0		0		P	1	0
12/05/84	HOLLBROOK	AZ	Wayne Daniels Truck, Inc.	0	Sulfuric Acid	0	Hydrochloric Acid	0		T	3	0
12/26/84	PALMDALE	FL	Ctl. Distribution	0	Sulfuric Acid	0		0		T	1	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
05/11/84	TERRE HAUTE	IN	Indiana St. University	1875	Sulfuric Acid	0		0		P	2	0
01/26/83	INDIANAPOLIS	IN	Ulrich Chemical Co.	37500	Sulfuric Acid	0		0		P	10	0
04/30/83	NEW HAVEN	CT	Consolidated Railroad	38	Sulfuric Acid	0		0		T	1	0
07/27/83	COLUMBUS	OH	Unknown	750	Sulfuric Acid	0		0		T	1	0
07/27/83	TOLEDO	OH	Conrail	15	Sulfuric Acid	0		0		T	1	0
08/12/83	GEORGIA PACIFIC	LA	Georgia Pacific	0	Sulfuric Acid	0		0		P	1	0
10/07/83	CINCINNATI	OH	Chessie Systems Railroad	8	Sulfuric Acid	0		0		T	1	0
09/24/84	BELMONT	CA	Unknown	413	Tetrachloroethylene	0		0		T	2	0
01/30/85	LOS ANGELES	CA	Unknown	1875	Tetrachloroethylene	0		0		P	8	0
09/28/82	LIVINGSTON	LA	Unknown	0	Tetraethyl Lead	0	Vinyl Chloride	0		T	5	0
06/26/84	VICTORVILLE	CA	Unknown	37125	Tetrahydrofuran	0		0		T	3	0
12/22/83	ELIZABETH	NJ	Unknown	413	Thionyl Chloride	0		0		P	1	0
03/05/85	Kelton	OH	IML Freight Lines	225	Thiophene	0		0		T	1	0
05/15/84	PALO VERDE	CA	Unknown	0	Thisodian	0		0		T	1	0
02/12/85	MIDDLESEX	NJ	Chem-Ray Coating Corp.	0	Toluene	0	Methyl Ethyl Ketone	0	N-Butyl Alcohol	P	8	1
11/15/84	PHOENIX	AZ	Western States Petroleum	0	Toluene	0		0		P	9	1
04/18/85	AFTON	VA	Greenwood Chemical Co.	0	Toluene	0		0		P	1	3
11/09/83	CARROLLTON	KY	M & T Chemical Co.	188	Toluene	0		0		P	2	0
02/26/84	DOLTON	IL	McKesson & Envirosystems Co.	0	Toluene	0		0		P	1	0
03/16/85	SAN DIEGO	CA	Fluid Systems, U.O.P. Inc.	0	Toluene Diisocyanate	0		0		P	25	0
01/12/83	WATERTOWN	NY	Chemical Leaman Tank Lines	750	Toluene Diisocyanate	0		0		T	3	0
01/31/83	MIAMI	FL	Dixie Bedding Co.	38	Toluene Diisocyanate	0		0		P	2	0
09/27/83	LINDEN	NJ	Teag Electric Inc.	300	Trichloroethane	0		0		P	12	0
04/11/84	NEWARK	NJ	Sherwin Williams Paint	0	Trichloroethane	0		0		P	5	1
10/22/82	QUEENS	NY	Allomatic Industries	413	Trichloroethylene	0		0		P	40	0
03/30/84	FRANKFORT	IN	Kaiser Agricultural Chemical	300	Trifluralin	0		0		P	1	0
12/22/84	SAGINAW	MI	Chessie Systems Railroad	0	Trimethylamine	0		0		T	3	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
02/17/84	DAYTON	OH	County of Montgomery	0	Unknown	0		0		P	4	0
05/15/84	NEWCASTLE	DE	Airport Toyota Inc	0	Unknown	0		0		P	1	0
05/31/84	MANNHATAN	NY	Con Edison	0	Unknown	0		0		P	11	0
12/03/84	CONCORD/MANCHESTER	NH	Unknown	0	Unknown	0		0		P	1	0
05/25/83	LEWIS	MA	Louis Chemical Corp.	0	Unknown	0		0		P	12	0
06/15/83	UTICA	MI	Liquid Disposal Inc.	0	Unknown	0		0		P	6	0
07/11/81	SANTA FE SPRINGS	CA	Unknown	0	Unknown	0		0		P	8	0
04/14/85	SUN VALLEY	CA	Research Organic Inorganic Chem. Corp.	0	Unknown	0		0		P	10	0
11/26/80	INDIAN TRAIL	NC	Radiator Specialty Co.	0	Unknown	0		0		P	52	0
04/27/80	WHITE SPRINGS	FL	Occidental Chemical	0	Unknown	0		0		P	11	0
05/12/80	BROOKLYN	NY	Lowenstein Dyes and Cosmetics	0	Unknown	0		0		P	1	0
02/06/81	BERENSVILLE	IL	Lawter Chemicals	0	Unknown	0		0		P	6	0
11/05/81	GARY	IN	Anderson Development Co.	0	Unknown	0		0		P	6	0
07/10/81	KALAMAZOO	MI	American Cyanamid and Chemical Co.	0	Unknown	0		0		P	1	1
12/09/81	PORT ARTHUR	TX	Gulf Oil	0	Unknown	0		0		P	23	0
01/14/82	POUGHKEEPSIE	NY	Berncolors Poughkeepsie Inc.	0	Unknown	0		0		P	11	2
03/26/84	SAN JOSE	CA	Santa Clara Cny	0	Unknown	0		0		T	4	0
10/08/84	HODGKINS	IL	Unknown	0	Unknown	0		0		T	6	0
07/13/84	IMPERIAL	CA	Unknown	100	Unknown	0		0		T	1	0
10/19/83	KEYSVILLE	VA	General Battery Corp.	0	Unknown	0		0		T	1	0
04/02/83	PHILADELPHIA	PA	Rohm and Haas	0	Unknown	0		0		P	1	0
07/08/83	FT. WAYNE	IN	Yellow Freight	1238	Unknown	0		0		T	1	0
12/12/83	PIKETON	OH	Goodyear Atomic	0	Uranium Hexafluoride	0		0		P	7	0
08/31/84	RIDGEFIELD	NJ	Unknown	0	Urethane Resin	0		0		T	6	0
09/01/79	DEER PARK	TX	Unknown	15750000	Vacuum Distillate	7875000	Ethyl Alcohol	0		P	9	1
06/17/83	MEDLEY	FL	Highway Transport Inc.	8	Vinyl Acetate	0		0		P	1	0

SUMMARY OF EVENTS WITH DEATHS OR INJURIES

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
07/30/83	BATON ROUGE	LA	Formosa Plastics Co.	0	Vinyl Chloride	0		0		P	2	0
09/19/80	FITCHBURG	MA	Great American Chemical Co.	0	Vinyl Chloride	0		0		P	8	0
02/02/84	TOLEDO	OH	CE Casting Co.	10	Vinyl Chloride	0		0		P	1	0
06/07/84	CARSON	CA	Joslyn Manufacturing & Supply	0	Zinc	0		0		P	9	1
01/27/84	ROCHESTER	NY	New Dominion Machine Co. Ltd.	10	Zinc Cyanide	0		0		P	4	0
08/22/81	DESTREHAM	LA	St. Rose Fleeting	0	Zinc Dust	0		0		T	2	0
*** Total ***											4717	138

APPENDIX H

LIST OF EVENTS IN WHICH DEATHS OCCURRED

SUMMARY OF EVENTS WITH REPORTED DEATHS

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
08/15/84	SIMSBURY	CT	Ensign - Brickford Industries	0	Acetone/Nitric Acid	0		0		P	0	3
02/28/80	DE SOTO	KS	Sunflower Army Ammunition Plant	0	Alcohol	0		0		P	1	1
07/27/84	HOUSTON	TX	Unknown	23000	Aluminum Phosphide	0		0		T	8	1
05/29/85	SAN ANTONIO	TX	Lone Star Ice House	0	Ammonia	0		0		P	10	3
06/16/84		OH	Duane Martin Farm	3750	Anhydrous Ammonia	0		0		T	0	1
11/26/80	MENDOTA	CA	Unknown	38	Carbolic Acid	0	Gasoline	0		T	0	1
03/01/83	CHARLESTON	WV	FMA Corp.	225	Chlorine	0		0		P	3	1
10/31/82	NIAGARA FALLS	NY	E.I. DuPont de Nemours and Co.	2000	Chlorine	0		0		P	76	1
08/16/84	CLEVELAND	OH	Mobile Tank Car Services	0	Coal Tar	0	Light Oil	0		T	21	2
07/08/77	FAIRBANKS	AK	Unknown	0	Crude Oil	0		0		T	6	1
06/17/85	HOPEWELL	NJ	American Surfacing Co. Inc.	0	Ethyl Acetate	0	Polyurethane Binder	0		P	0	1
06/09/81	FT. MADISON	IA	Chevron Chemical Co.	7500	Ethylamine	0		0		P	1	1
10/13/81	FREEPORT	TX	Dow Chemical Co.	0	Ethylene	0	Polyethylene	0		P	7	6
07/30/81	GRANTSVILLE	VT	Mining Services International	0	Explosives	0		0		P	0	5
05/27/83	BENTON	TN	Webb Bait Farm	0	Explosives	0		0		P	1	11
11/26/83	BALLPORT	NY	New York Pyrotechnic Inc.	0	Explosives	0		0		P	23	2
11/25/80	KENNER	LA	Mobil Oil Co.	0	Flammable Liquid	0		0		T	2	7
09/05/84	ANTHONY	KS	Farmers Oil Co.	0	Fuel	0		0		P	3	2
09/01/83	CHALMETTE	LA	Tenneco Oil Refinery	900000	Gasoline	0		0		P	24	1
12/03/79	TORRANCE	CA	Mobil Oil	0	Gasoline	0	Butane	0		P	0	3
06/23/84	HIALEAH	FL	Unknown	60000	Gasoline	0		0		T	0	1
08/23/80	MADISONVILLE	LA	Stokes Oil Co.	0	Gasoline	0		0		P	1	1
11/14/81	CANON CITY	CO	Unknown	0	Gasoline	0		0		T	6	7
07/28/83	SANBORN	IA	Dahleen Transportation	0	Hexane	0		0		T	2	1
05/10/84	PEABODY	MA	Henry Leather Co.	0	Hydrocarbons	0	Benzene	0	Lacquer	P	125	1
01/13/82	UTICA	MI	Liquid Disposal Corp.	0	Hydrogen Sulfide	0		0		P	15	2
07/27/84	BETHLEHEM	PA	Joseph Ayers Co.	0	Isopropyl Alcohol	0	Hydrocarbons	0		P	3	1

SUMMARY OF EVENTS WITH REPORTED DEATHS

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
07/24/80	QUEENS	NY	Unknown	0	Lacquer	0		0		P	40	4
05/30/78	TEXAS CITY	TX	Unknown	0	Light Hydrocarbons	0	Hydrocarbons	0		P	10	5
12/20/83	EAST CAMDEN	AR	Tracor-MBA	0	Magnesium	0		0		P	21	1
06/07/84	ST. LOUIS	MO	Slay Transport	0	Maleic Anhydride	0		0		P	1	1
07/21/83	BEACON FALLS	PA	Chippewa Township Sewage Treatment	0	Methane	0	Chlorine	0		P	9	2
02/02/82	LIMA	OH	Vistron	0	Methyl Acrylate	0	Acrylonitrile	0		P	1	1
10/03/83	HOUSTON	TX	J. Chemical Co.	30000	Methyl Bromide	0	Malathion	0		P	5	2
11/19/82	HAMILTON CO.	OH	Ohio Valley Graphic Ink Co.	0	Methyl Ethyl Ketone	0		0		P	0	1
09/03/81	MARRERO	LA	Celotex Corp.	0	Naphtha Asphalt	0		0		P	13	1
06/02/82	GULFPORT	MS	Plastifax Corp.	0	Nitric Acid	0		0		P	61	3
02/21/85	SAYREVILLE	NJ	Hercules Powder Plant	0	Nitrocellulose	0		0		P	5	1
02/06/81	TERREBONNE PARISH	LA	Union Texas Petroleum	0	Oil	0		0		P	0	3
08/03/80	VAN NUYS	CA	Oxy Med	0	Oxygen	0		0		P	1	3
03/03/80	LOCKPORT	NY	Twin Lake Chemical	1800	Phosgene	0		0		P	7	1
06/02/82	WESTLAKE	LA	Olin Chemical	0	Phosgene	0		0		P	60	1
04/14/83	CASA GRANDE	AZ	Southern Pacific Trans. Co.	0	Phosphorus	0		0		T	4	1
03/21/85	PLAINFIELD	NJ	Oliver Brown Trucking	0	Polyvinyl Chloride	0		0		P	90	1
10/03/78	DENVER	CO	Unknown	0	Propane	0		0		P	1	3
10/21/80	NEW CASTLE	DE	Unknown	14000	Propylene	0	Polypropylene	0		P	12	6
09/19/83	ALAMOGORDO	NM	Drexel Chemical Co.	12000	Sodium Chlorite	6000	Urea	0		T	0	2
07/20/84	TEXARKANA	TX	International Paper	100	Sodium Hydroxide	0		0		P	1	1
08/28/83	DONEGAL	PA	Unknown	41000	Sodium Nitrate	0		0		T	10	4
04/30/85	GOOSE CREEK	SC	Mobay Chemical Corp.	0	Sodium Sulfhydrate	0		0		P	5	1
12/20/84	AKRON	OH	Recycle Energy	0	Solvent	0		0		P	7	3
08/22/84	FREEDOM	PA	Ashland Petroleum Co.	0	Specialty Oils	0		0		P	1	2
01/19/85		CA	Unknown	60000	Sulfur	0		0		T	7	2
05/15/80	DEPUE	IL	Mobil Chemical Oil	7500	Sulfuric Acid	0	Hydrogen Sulfide	0		P	1	1

SUMMARY OF EVENTS WITH REPORTED DEATHS

DATE	CITY	ST	COMPANY	QTY1 Lbs.	SUBSTANCE1	QTY2 Lbs.	SUBSTANCE2	QTY3 Lbs.	SUBSTANCE3	PLANT OR TRANS	INJURIES	DEATHS
12/13/84	ELKRIDGE	MD	Chesapeake Finished Metals Co.	0	Sulfuric Acid	0		0		P	0	2
02/12/85	MIDDLESEX	NJ	Chem-Ray Coating Corp.	0	Toluene	0	Methyl Ethyl Ketone	0	N-Butyl Alcohol	P	8	1
11/15/84	PHOENIX	AZ	Western States Petroleum	0	Toluene	0		0		P	9	1
04/18/85	AFTON	VA	Greenwood Chemical Co.	0	Toluene	0		0		P	1	3
04/11/84	NEWARK	NJ	Sherwin Williams Paint	0	Trichloroethane	0		0		P	5	1
07/10/81	KALAMAZOO	MI	American Cyanamid and Chemical Co.	0	Unknown	0		0		P	1	1
01/14/82	POUGHKEEPSIE	NY	Berncolors Poughkeepsie Inc.	0	Unknown	0		0		P	11	2
09/01/79	DEER PARK	TX	Unknown	15750000	Vacuum Distillate	7875000	Ethyl Alcohol	0		P	9	1
06/07/84	CARSON	CA	Joslyn Manufacturing & Supply	0	Zinc	0		0		P	9	1
*** Total ***											764	138